



High Quality Electric & Non-Electric Sailplanes,  
Radios, and Accessories for the Sailplane Enthusiast

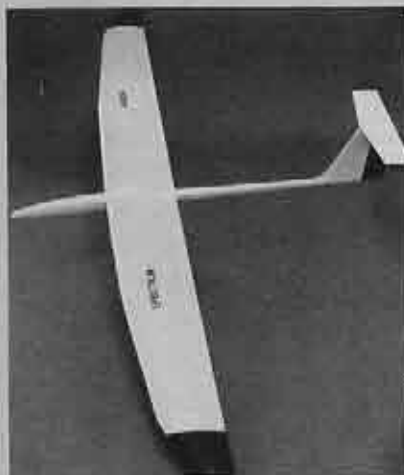
## 1st Anniversary Sale!

To Thank all our valued customers

### ≡ SPECTRUM

The **SPECTRUM** is the next generation thermal duration sailplane. It has a Kevlar reinforced fuselage with a slip-on nose cone. The **SPECTRUM** comes with a S3021 or an RG15 airfoil. Pre-sheeted wings and stab that have the control surface capping material installed prior to sheeting the wing to provide additional strength for the control surfaces. The ailerons, flaps and elevator are pre-cut during the exacting manufacturing process that sets the **SPECTRUM** kit apart from the rest of the crowd.

**Special \$295**



#### SPECTRUM SPECIFICATIONS:

Wing Span:	104 inches
Wing Area:	855 square inches
Airfoil:	S3021 or RG15
Aspect Ratio:	13:1
Weight:	60 ounces
Wing Loading:	10 ounces/square foot
Price:	<del>\$395.00</del> + Shipping

Specials valid through July 30, 1994

Also available for the Two Meter flyer, the *Spectrum Two Meter*

Wing Span:	78 1/2 inches	Wing Area:	554 square inches
Airfoil:	S3021	Aspect Ratio:	11.2:1
Weight:	40 - 43 ounces	Wing Loading:	10 ounces/square foot
Price:	<del>\$295.00</del> + Shipping		

**Special \$195**

★ VISA ★ MASTERCARD ★ AMERICAN EXPRESS ★ DISCOVER ★

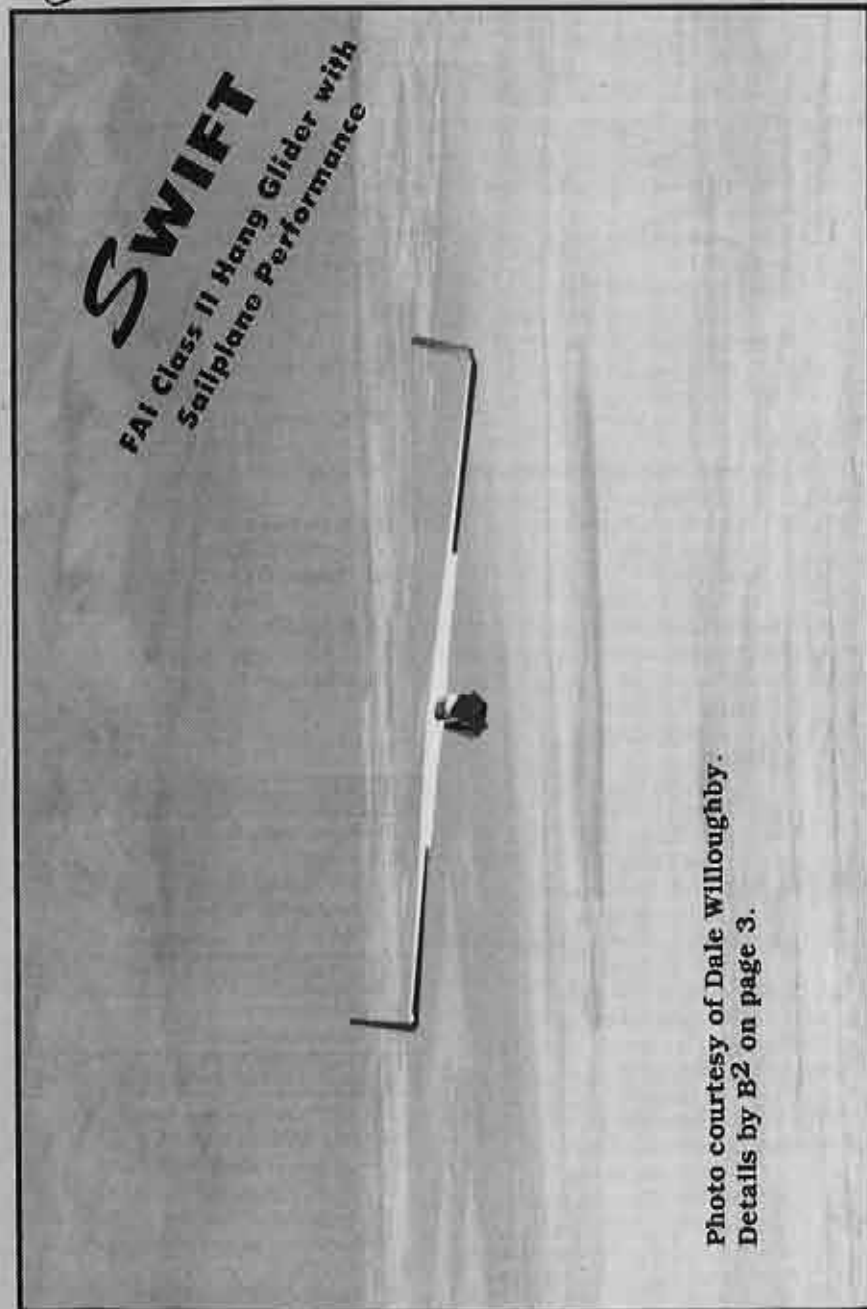


Photo courtesy of Dale Willoughby.  
Details by B2 on page 3.

# R/C Soaring Digest

A publication for the R/C sailplane enthusiast!



## Table of Contents

1 Soaring Site Jerry & Judy Slates	39 My "Hodge-Podge" Canard George Siposs	
3 On The Wing Steve Morris and the Swift Bill & Bunny Kuhlman	42 Servo Wiring George Siposs	
6 Those Wonderful Winglets Robin Lehman	45 Flying Hint George Siposs	
11 Personal Pinions Pancho Morris	45 Gapless Hinge George Siposs	
12 Lift Off! Charging the Air with Excitement Ed Slegers	47 A Letter to the Soaring Community Airtronics, Inc.	
15 Jer's Workbench, Travel Kit Jerry Slates	48 1994 CIAM Report Terry Edmonds	
15 Electronics News Dave Darling	49 Paris Was Great Jack Sile	
16 Atlatl-Assisted Launch or Hand Launch Topics Scott Smith	49 Thermo Flügel DG600 Jerry Castillo	
18 Emergency Bellcrank George Siposs	56 NASSA News Greg Vasgerdsian	
19 My Buggy Donell Johnson	58 Mid-South Soaring Championships Bob Sowder	
20 On The Air with Cornfed The Couple Dozen Club Fred Rettig	<b>Other Sections/Information</b>	
23 My High-Tech Tree Locator Dr. Amel Klein	50 New Products	
25 Winch Line, Pro-Case Shipping Container Gordon Jones	54 Events	
27 Static Testing of Wings George Siposs	61 R/C Soaring Digest Availability of Back Issues Subscription Information	
28 Beginner's Corner Finishing Wood Wings Ed Jentsch	<b>Advertising</b>	
30 A Simple Calculator for Feather/Cut Taper Ratios Cameron Ninham	58 Advertiser Index	
32 About the 140" Genie Sailplane Harley Michaelis	59 Classified Ads	
35 Another Computer Simulation for the Winch Launch of the RC Sailplane John Hazel	<b>Special Interest Groups &amp; Contacts</b>	
	52 R/C Soaring Resources	
	53 F3B/USA • F3F/USA	
	53 League of Silent Flight - LSF	
	53 North American Scale Soaring Association - NASSA	
	53 National Soaring Society - NSS	
	53 T.W.I.T.T.	
	53 Vintage Sailplane Assoc. - VSA	

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

RCSD should not be considered to endorse any advertised products or messages pertaining hereto. An advertising rate card is available for businesses, clubs and personal advertising.



R/C Soaring Digest is printed on recycled paper.

### RCSD Staff

Jerry Slates - Editor/Technical Editor  
Judy Slates - Desktop Publisher, General Managing Editor, Subscriptions  
[Material may be submitted Via 3.5" Disk (MAC or IBM compatible) or 5.25" 360K IBM compatible, and is most appreciated!]

Please address correspondence to:

**Jerry & Judy Slates**  
**R/C Soaring Digest**  
**P.O. Box 2108**  
**Wylie, TX 75098-2108 U.S.A.**  
(214) 442-3910, FAX (214) 442-5258

### Feature Columnists

Wil Byers  
Marc Dufresne, Gordon Jones  
Bill & Bunny Kuhlman (B<sup>2</sup>)  
Fred Rettig, Martin Simons  
Jerry Slates, Ed Slegers, Scott Smith

Printing by J. Morgan Graphics & Design  
[510] 674-9952

Copyright © 1994 R/C Soaring Digest. All rights reserved.

## The Soaring Site

### World Records

The following letter is from Frank Zaic, Northridge, California. The article, "World Records", was written by Graham Woods and appeared in the April issue of RCSD.

"Had to re-read WORLD RECORDS several times. Just could not imagine how the birds were able to be airborne for such a long time - and sleep in flight. Sure is something.

"A side note. Been wondering how the birds develop the circling mode. A plane has ailerons and rudder to develop a circling flight or mode. Could it be that birds have similar controls?

"Could be that the lift difference could be accomplished by variation of the angular stroke of the wings. But the rudder part...

"Been watching soaring birds on TV and noticed how the tail varies from horizontal to angular with respect to the horizon. Noting the angular change with respect to the circle, it would seem that the tail is positioned negatively with respect to the airflow. Something like a negative setting of the stab. Assuming negative flow on air on the angular stab, the force would tend to be similar to a left rudder setting in a left circle.

"From the above observation, it would also seem that the bird has its C.G. slightly ahead of its basic lift so that the tail needs to be on a slight negative setting.

"Believe that there has been some wind tunnel testing with birds, but at the moment do not have the information on it."  
Thanks, Frank! Perhaps someone has some info. on the testing they can share with us.

### Visa/Mastercard

We get quite a few calls and notes asking us if we can take Visa or Mastercard. We do not have the facilities, but have given a good deal of thought to your requests.

We are extremely sensitive to the fact that, for our subscribers outside of the U.S.A., the cost to obtain a money order or check in US funds is not always easy and can be very expensive. However, most of the requests are coming from the U.S.A. Beyond cost, the most important aspect of doing this, however, is the fact that we would wind up spending much of our time taking and verifying card information, while RCSD sits impatiently waiting to be prepared to go to the printer, or stuffed into envelopes. It currently takes over 40 hours between us to do labels, stamp, stuff, and get RCSD ready to go to the post office each month. So, for now, we have decided not to take credit cards, but will wait until something else causes us to rethink this subject, again. We are sorry for any inconvenience this may cause, but hope that most of you understand. Thanks!

#### U.S.A. Bulk vs. First Class Mailing

"What is the difference between bulk and first class mailing in the U.S.A.?" This question comes up at least once almost every day and is usually associated with someone not having received a copy of RCSD in what they feel is a reasonable period of time. Simply stated, "The difference between bulk mailing and first class mailing is the amount of time it takes the post office to deliver RCSD to the subscriber after it is delivered to the post office."

The first class and the bulk copies all go into envelopes. However, the first class is metered (We have a metering machine.), and we meter (stamp) each for \$.98, and place loose in a tray.

The bulk mailing is prepared differently. First, it is not metered, but rather has a permit mailing imprint on the envelope where a stamp would normally be. It is sorted by zip code, and banded into zip code areas with rubber bands, in accordance with postal regulations as contained in the postal Domestic Mail Manual. It is placed in sacks containing

labels that direct it to the proper state or postal distribution unit. By doing all this work, the cost of each piece is \$.75 less than first class mailing. However, here is the catch: "How long does it take to be delivered?" We have found that it varies by state, and area. The first class arrives anywhere from 1 - 4 working days after everything is mailed. The bulk mail can take 9 - 10 days in Texas, while it can take 3 - 4 weeks for everyone else. In other words, if you want your copy of RCSD quickly and don't want to wait, then you need to be on the first class mailing and pay the difference in cost. If you don't mind waiting, then you benefit from the discount but have to wait a bit for your copies to arrive.

We have reviewed magazine status, which is second class, in depth. With it, our paperwork significantly increases along with cost. In regards to delivery time for example, we are told that we can send our foreign subscriptions by second class, as well. The catch? Everything goes by surface mail! What happens in the U.S.A.???

Well, most of you don't care about any of this; all you want to read about is sailplanes! Right!? Right! So, what we're trying to say, is that we will continue to strive to get RCSD to the printer by the middle of the month, so that we can package it properly and deliver it to the post office by the first week of the next month, so that the material is as current as possible. We intend to go through as little bureautic tape and paperwork as possible. However, at some point we may need to rethink this subject too, as there would be less work for us if the third class and bulk were only one mailing. For now? Sit back. Read and enjoy! Thanks go to each of you for your support and positive input. Thanks go also to those who have found the time to share with all of us their tips, hints, experiences, and research findings through the pages of RCSD!

Happy Flying!  
Jerry & Judy

R/C Soaring Digest



In the early 1980s we took our two Ravens to a large field north of our home for an afternoon of flying. We were just getting unpacked when another car drove up. A young fellow jumped out and said he was going to be flying his helicopter over in the far corner of the field. After checking for frequency conflicts, he set up his helicopter and we continued dragging stuff out of our car. The helicopter was soon cavorting around the sky, and we had one of our Ravens ready for the high start.

We launched the Raven and watched as she climbed out. The helicopter came

to a screeching halt in the middle of a maneuver and began a plummet to the ground. Following a rapid but safe landing, the pilot ran to the 'copter and turned everything off. Our Raven was still on the line as he turned to run to where we were standing.

Bubbling with excitement, he exclaimed, "Wow! I can't believe it! Someone else is interested in tailless sailplanes! This is fantastic!" Over the next hour or so, the young helicopter pilot flew the Ravens, and we discussed tailless sailplanes at some length.

This was our introduction to Steve Morris. Over the next few months, we learned that Steve worked for the Boeing Company in their missile division, but that his true loves were low Reynolds number aerodynamics and unconventional planforms. He had a computer system which he portrayed as being "more computing power than man was meant to have," and had already experimented with large swept wing planforms. At the time of our meeting, Steve was working on a smaller, lighter, computer-designed swept wing



June 1994





is usually foot launched from the slope, but can also be towed to altitude. True aerodynamic control surfaces, elevons and flaps, provide positive control at all flight speeds. Elevons are operated by a single side mounted control stick—just like modern jet fighters. The flaps, which provide a speed range of from below 20 to over 70 m.p.h., are controlled by a

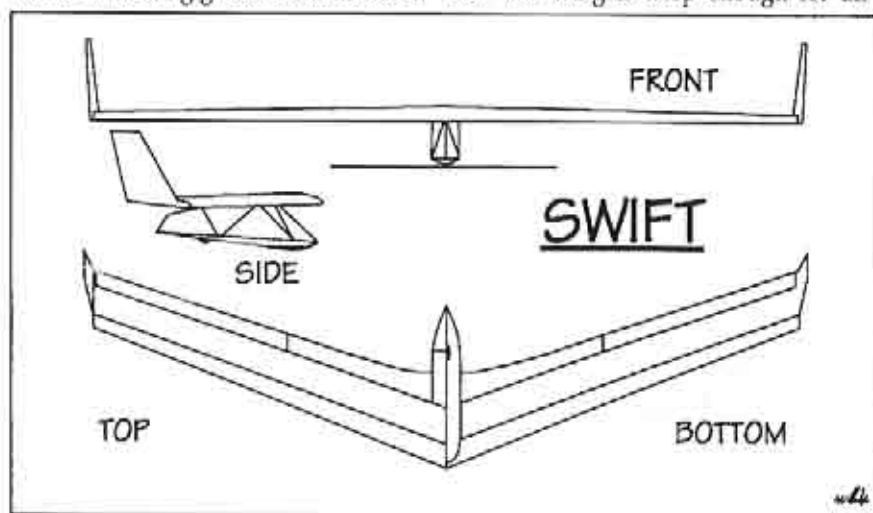
planform, doing quite a bit of hang gliding, and contemplating returning to Stanford University for his doctorate degree.

Dr. Stephen Morris' name is now "in the news" following release of the SWIFT, an FAI Class II hang glider which he designed with Prof. Ilan Kroo of Stanford University. There are several characteristics which make the SWIFT unique. It is a tailless rigid wing glider with excellent performance. It is easily carried on the top of a car, can be assembled in a matter of minutes by a single person, and is capable of flying hundreds of miles with a high degree of comfort for the pilot.

The SWIFT (Swept Wing with Inboard Flap for Trim) provides sailplane performance with hang glider convenience. It

mechanism on the opposite side of the cockpit. With a glide ratio of 25:1, the SWIFT has a tremendous potential range. Foot landings are not at all traumatic, due to the low stall speed of the SWIFT, and a small fuselage mounted wheel makes for effortless landings on smooth surfaces.

The SWIFT has a number of positive attributes which make it a good scale subject. The relatively short wing span is conducive to both 1/4 or 1/3 scale; just under 3 meters and just under 4 meters, respectively. The root airfoil seems to have a cusp on the upper rear surface—something like a Liebeck section. This could be easily duplicated with one of the reflexed airfoils designed for model use. The wing is deep enough for all



Classification	FAI Class II hang glider
Wingspan	39 ft. (11.89 m)
Tip chord	3.03 ft.
Taper ratio	0.75
Wing area	135 ft. <sup>2</sup> (12.54 m <sup>2</sup> )
Aspect ratio	11.5:1
Weight	115 lbs. (50 kg) without 'chute* 135 lbs. (62 kg) with 'chute*
Rated load	+6 g to -4 g
Flap span	8.58 ft.
Flap chord	25%
c/4 sweep angle	20 degrees
Wing twist	8 degrees
CG location	4 ft. back from apex of leading edge
L/D	24:1 maximum, with pilot fairing 15:1 at 60 m.p.h. (97 kph) 20:1 maximum without pilot fairing
Vne	75 m.p.h. (120 kph)
Aerodynamic concepts by Prof. Ilan Kroo and Dr. Stephen Morris	
Design, structure, and development by Brian Robbins, Eric Beckman, and team pilot Brian Porter	

\* Second Chantz, Inc. "Pocket Rocket" HG-350 ballistic parachute system

electronics to be totally enclosed, although batteries and receiver could be placed in a hollow "pilot."

The simplicity of hang glider instrumentation, typically just an air speed indicator and variometer, is a bonus for those who appreciate details but dislike spending inordinate amounts of time with extensive detailing. The pilot is enclosed in a transparent fairing, and this provides some additional challenges to the modeler.

The SWIFT has been featured on several television programs and in a number of magazine articles, and a videotape is available from the manufacturer, Bright Star Gliders. The Bright Star Gliders tape includes information on fabrication tech-

niques and car top transportation, in addition to some beautiful in-flight footage.

The SWIFT is constructed of Kevlar™ fabric and carbon fiber over a solid foam core, just as our modern models. Building a large scale model of the SWIFT would therefore not pose many problems, but would certainly amount to an impressive accomplishment.

*The photographs of the SWIFT included here are courtesy of Dale Willoughby.*

*The SWIFT videotape is available in VHS NTSC format (U.S.) for US\$24, and in VHS PAL format (Europe, Australia, etc.) for US\$29. Contact: Bright Star Gliders, 48 Barham Avenue, Santa Rosa, CA 95407; (707) 576-7627. ■*



PIK 20 scratch built by BRUG GREUTER in foreground. This 1/4 sized 4 1/2k. scale glider from Finland sports a scale green color scheme. Highly aerobatic.

Daniel ARBELLI with his 1/4 ASW 24. The youngest pilot. Aged 11.

## Those Wonderful Winglets

...by Robin Lehman  
New York, NY

For a couple of years now, I have corresponded with my Modell Segelflug pen pal, Jack Kagi, who is an avid Swiss scale sailplane enthusiast. I met him three years ago at the IGC (those interested in large sailplanes) glider tow meeting. This May, I had a quick six day business trip to Europe - one day a city - and had saved Sunday in the hope that the weather, the wind, and the model enthusiasts might cooperate.

It was grim and gray all over Europe on Friday and Saturday, but a few hours into the day on Sunday, the gloom burned off and produced a glorious deep blue sky. So off I went to meet Jack and a small group of enthusiasts who were air towing sailplanes at a freshly cut field near Phaffikon, a lovely tiny village nestled in the Swiss green hills a half hour west of Zurich.

With only a couple of wrong turns, I found them - eight or ten cars, three tow planes, and a nice bunch of gliders already set up with towing in progress. I met my friend Jack, my indispensable



Albert Kobel with his homemade tow plane ARF all glass Phonix. It weighs 12k, has a 3W-70 German motor with a 23x10 prop which pulls 30k!! static thrust.



The lineup. Peter Wunderli's 1/3 ASW 24 (10k. 5m.) in foreground. Rosenthal fuselage, scratch built wings.



1/4 ASK 21 built by Jack Kagi from a Rodel Modelle kit. Flies beautifully! (4.2m. 5 1/2k.)



Daniel's ASW 24 has just started another tow.

translator, and set about feasting my eyes on the quarter and third-size scale gliders lying about - all with the usual immaculate Swiss workmanship.

There were three or four ASW 24s, both one-third and quarter-sized; several Multiplex DG500 and 600s; a couple of vintage gliders I was not familiar with - but lovely, slow, and graceful in the air; a very interesting PIK-20 scale glider scratch built by Brung Greuter and finished in a scale green color (Yes, the real one was green.) - this glider proved to be highly aerobatic performing both inside and outside loops, rolls, inverted flight, etc.; and Jack brought a very nicely finished quarter-size ASK 21 from a Rodel Modelle kit which he very graciously let me fly. This two-seat trainer just floated around with the greatest of ease and basically flew itself. No trouble thermalling this one. In fact, when I flew it, I had the spoilers out about 50% of the time so as not to get too high!

A little later on in the day, Peter Arbelli and his son Daniel, aged 11 and the youngest flyer there, showed up with their two ASW 24s. When I saw Daniel fly three years ago, his dad wouldn't let him land or tow on his own, but now Daniel does just fine. He started flying at age 7. Peter does the repairing, and Daniel does the flying. His dad hasn't yet talked him into the building stage!

A great many of the gliders there had fuselages from various German manufacturers, and the wings were scratch built. All of them were foam wings covered with balsa and fiberglassed. These guys do superb workmanship and the end result is a beautiful, clean, durable wing.

There were several tow planes there, all more or less similar in design. They were all low wing ships approximately 90 inches in span, weighing in the 20 lb. range. For power, they used 3W-70 two-



1/4 DG600, 5k, 4m, by Albert ZGIAGGEN with winglets.



Mary Ellen Crain holds an SB9 from Kraus kit. 1/5, 9 lbs., 4.4m.



PIK 20 1/4 sized scale glider from Finland, scratch built by BRUG GREUTER. Very aerobatic!

stroke gasoline motors with homemade mufflers. One of the tow planes had a long baffled tube which ran the length of the body and out the tail. The others had homemade mufflers made from butane cans, and were they ever quiet!

Albert Kobel makes his own tow plane and sells it commercially in Switzerland. It has a high-lift wing, is all fiberglass throughout, and comes completely ready-made. This ship weighs around 22 lbs., and with a 24 - 10 prop with the 3W-70 motor, has about 30 lbs. of static

thrust - more than enough to pull up one of those giant half-size sailplanes which I fly at home. Again, the usual immaculate Swiss workmanship.

Interestingly, many of these sailplanes used a bead of silicon to attach the ailerons to the wing. A very efficient and neat way of attaching the aileron with no gap.

Almost all the gliders were using a new electronic retractable wheel with a very nice suspension system for landings on rough fields. According to Jack, these work flawlessly!

Most interesting of all for me personally, Albert Zgiaggen brought with him his quarter-size DG600 equipped with winglets. This is a four meter ship weighing some 11 lbs. or so. According to him, it flew very badly, and so he thought he would experiment to see exactly what winglets would do for him. He told me that a rather nasty and difficult to fly airplane with no floating ability now was transformed into an excellent thermal ship. He thinks that the winglets gave



Ron Wahl holds a 1/5 SB9. 9 lbs., 4.4m., built from a Kraus kit. Note the winglets!

the airplane both stability and more lift-ability.

The theory is that without winglets, most airplanes have a lot of turbulence at the wing tips. By adding small vertical winglets at the tips, this greatly increases the laminar flow and hence the lift, especially at slow air speeds - exactly where our model sailplanes are flying!

Little did I know at the time how useful this five minute conversation would become! Upon my return home, I test

flew my one-fifth sized SB9 - a scale ship with an extremely high aspect ratio. On air tow, the thing just wouldn't fly straight and fish-tailed back and forth the whole time. When I flew it around on its own, it was impossible to fly straight. It also was difficult to fly and had a tendency to drop a wing. It was a real pig. After flying for about 90 minutes, changing the nose weight and the incidence on the stab, I sort of zeroed in on the best combination, but even then, the SB9 was still an extremely difficult and somewhat unpleasant airplane to fly.

Then I remembered the winglets I saw a week earlier in Switzerland. So I made a pair as an experiment. A few days later I went to the field, taped them onto the wingtips and got towed up. MAGIC!

I immediately noticed that the SB9 now was a completely different bird. It flew dead straight on tow, and once I unhooked, I could do nice flat turns with no tendency to drop a wing. The winglets evidently were doing their job as they increased the lifting ability of the wing and took away any nasty tendencies to stall.

I can safely say that without the addition of winglets on this particular model, I would definitely have hung it up and not flown it again.

Interestingly, Today I received the June - July issue of *Sailplane and Gliding*, the magazine of the British Gliding Association (full-size gliders that is). What they

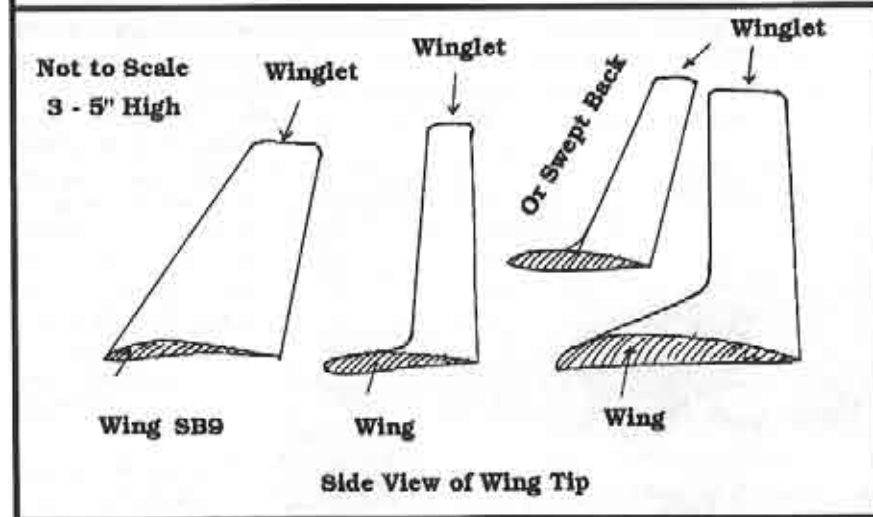
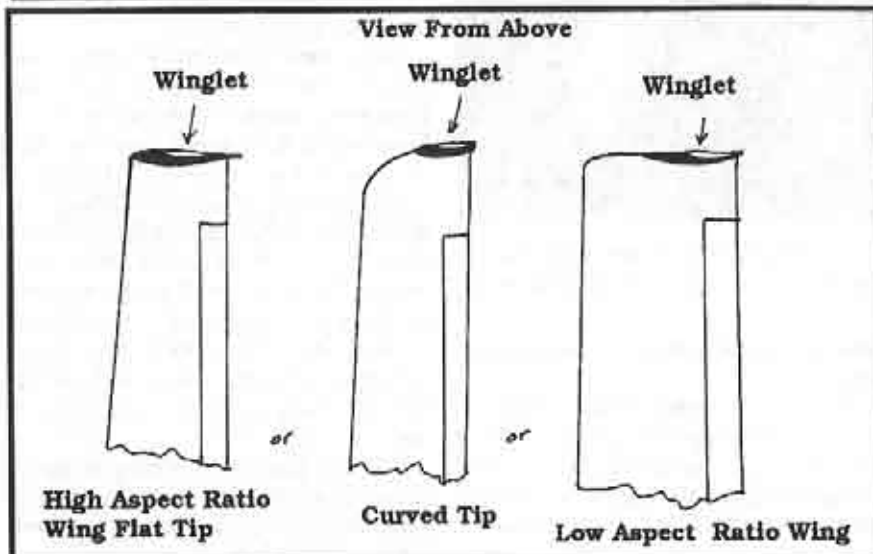
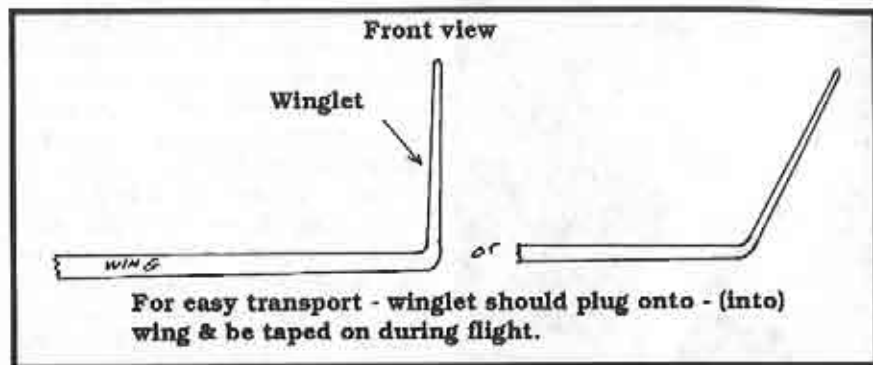
found out was that, "rather small winglets" had two beneficial effects: (1) induced drag is reduced increasing low speed performance, and (2) friction drag is improved.

To make a long story short, a small winglet



The usual immaculate Swiss workmanship.





produces a more stable airplane (less tip stall) and more lift with the same wing - just what we experienced with our scale models. What's most interesting is that engineers are not exactly sure why they work, but they certainly "increased performance gains spectacularly compared with the small size of the winglets".

All of the winglets (on sailplanes) have certain similar characteristics as follows:

- (1) A smooth transition from the flat wing surface to the vertical winglet. Also, the outboard edge of the winglet should come straight down towards the wing and then have a gentle smooth flowing curve to the bottom surface of the wing itself.
- (2) The rear bottom edge of the winglet transitions to the edge of the wing itself.
- (3) The outboard part of the winglet itself is flat whereas the inboard part of the winglet should have a slight air foil. It's almost as though someone took a wing and melted it, and curled the wing tip up.
- (4) As to size, a four meter glider has a winglet of about 4 - 5" high.
- (5) As you can see from the photograph, on the DG600 the front of the winglet is tapered back at quite an angle and then goes vertical creating a thin tall winglet. On the SB9, as the wing tip was so small anyway, my winglet was swept back from the leading edge and simply vertical from the trailing edge creating a slightly triangular shape. Evidently, both seem to work well.
- (6) A winglet can be either 90 degrees to the wing or be angled outward 20 degrees plus or minus. From what I can tell, either one works just fine.
- (7) Lastly, I have a strong suspicion that if a winglet is too small, it may not work on a scale model because of "the scale effect", but we do know

that a winglet of four or five inches in height is large enough to create a remarkable increase in performance. (See diagram.)

So, if you have a real air-dog you have hung up because it bites you every time you fly, you might consider experimenting with a winglet. It could turn into a real pussycat! ■

### Personal 'Pinions

...by Pancho Morris  
Mesquite, Texas

Kit manufacturers should not be allowed to use 3mm lite ply for fuselage sides in their kits.

On several occasions recently, planes have been crashed and the fuselages have been broken. These have sometimes been beginner class kits and, in at least one case, I crashed the plane! (OH, NO! I'm going to get my instructor's license revoked!) The fuselages on these planes were built out of 3mm lite ply with no other longerons or reinforcement.

I have found lite ply to be very brittle and basically of no use in model construction especially where strength is needed. Sixteenth aircraft ply is lighter and much stronger. Hard balsa with spruce or balsa and carbon fiber longerons would be much better.

The lite ply gives a false sense of strength, especially to a beginner. It is very frustrating to a beginner to have his plane damaged so easily and to be constantly having to repair it even after minor crashes.

If you are building a kit or helping a beginner with a plane, you might keep this in mind and look at ways to strengthen the fuselage. ■

# LIFT OFF!

...with Ed Slegers  
Route 15

Wharton, New Jersey 07885

(201) 366-0880 - FAX (201) 366-0549

9:30 AM - 5:00 PM (Closed Sun. & Mon.)

Many times I am asked what prop and motor combination works best. Although I have some of the combinations, I do not have them all. Kirk Massey, owner of New Creations R/C has put his findings in writing, and with his permission, I would like to pass them on to you.

If you need more information, give Kirk a call. He has more specs on this than anyone else I know, plus he is a friend and an all around good guy.

## Charging the Air with Excitement!

...by Kirk Massey  
Willis, Texas

This time we will look at ways to get the most out of your electrics. In all forms of competition, it's the little things that make the big difference between winning and losing. The tips suggested may seem insignificant, but they are essential for getting more out of your electric. We will primarily be dealing with Limited Motor Run and F3B type aircraft, however these tips will improve the performance of any type electric aircraft.

Let's start with the battery. I only recommend Sanyo's SCRC for limited motor run events. I use them like ballast in real light lift, and I run the 1000 ma SCRC's; on days when it's windy or there's strong lift, I use the 1700 SCRC's. This may change soon, though, as recent tests we've done have shown that you gain 12 oz. of thrust by using the 1700 SCRC's over the 1000's - the weight difference is only 4 oz. (test motor was an FAI 05G 5T Stage V 14x7 Aero-Naut on 7 cells). If you have a real light plane with an airfoil

that is designed to work best at higher wing loadings, the 1700 is the best choice. My Millennium Falcon flew better and climbed faster with the 1700's.

The next step is to transfer the battery voltage to the motor in the most efficient means possible. The thin metal straps that come on the pre-assembled battery packs are TOO thin and TOO high resistance to carry the amps we are drawing. The straps are actually resistors; if you look at packs that have been run at 30 amps or more, the shrink will be melted over the straps from the heat caused by the resistance. The best method to correct this is to remove the shrink, cut the straps in the middle, and then using a pair of needle nose pliers, roll the strap up toward the battery. This will break the three or four spot welds holding it to the battery. Using a dremel tool, lightly ground down the spot welds, then rough up the top surface of the battery; this will allow the solder to adhere better. Using at least a 45 watt iron (I use 80 watt.), where you've retightened the tip and cleaned off the black build-up, tin the ends of each cell; it should not take more than the count of five for the solder to start to flow. If it's taking longer, replace your tip and try again. (Do not stay on a cell over the count of ten, or you may cook it.) I use 1/8" dia. 40/60 rosin core solder for the straps and .032" dia. 60/40 on the connectors. I do not recommend the use of acid or flux on any connection in R/C. I have started using 13 ga. silicon insulated wire instead of braid to connect the cells. This ensures that there won't be any shorts between the strap and the cell rim and that the wire is the same gauge and quality of copper as your leads. Cut short lengths of wire from ctr. to ctr. of the cells, and strip 3/16" of insulation off the ends and tin. Solder one end to the battery then, using a small screw driver, hold the wire firmly down on the battery and remove the iron, being careful not to move 'til the

solder has cooled. Now attach another strap, and then come back to the other end of the strap. This allows the solder to fully cool before you bend the wire down, which could cause a weak joint if the solder is still slightly molten underneath. You should run at least 13 ga. wire, 12 ga. is a little better, and for you F3B fanatics, I have 10 ga. However, this won't fit in most connectors without some modifications.

On Sermos/Anderson Power Poles, cut off 5/16" off the wire end of the housing, and spread the round end of the contact using a lock blade knife with its edge on the gap of the contact and the back edge of the contact on the edge of the workbench, and push firmly. This will spread the contact open. Insert the wire crimp. Then solder; then insert in the housing making sure that they are square in the housing and snap firmly when plugged together.

On Astro, you have to drill out the housing for 12 ga., remove the housing for 10 ga., trim the wire slightly to fit the hole in the contact solder, install shrink over the wire up to where the contacts meet, and over all the female contact. (Note: Do not plug or unplug the Astro contacts. Under load, the arc will burn off the fine wire inside the contact.)

Now the speed controller. Some people are under the assumption that a relay will have the least losses. However, recent tests have shown that the 7 - 18 cell Steve Neu's FAI Speed Controller has less resistance than a 50 amp relay. I believe that the new Flightec SEC-SP will be right in there, also. The SPs are a vast improvement over his original SEC-2. They have a built-in heatsink BEC/Brake (either of which can be disarmed), a low voltage drop out, and microprocessor all in a small compact unit, and it's proportional. These are my ratings. If you don't want a BEC, use Steve Neu's unit. If you want a BEC, use the SEC-SP. If you don't want a proportional controller, use the

Simprop S-90-P 50 amp continuous 6 - 10 cells W/BEC, 6 - 14 cells wo/BEC. You can disable the BEC on this unit. Lastly, the standard S-90. It's the same package, just lower amp/volt rating.

Now to the motor. For 7 cell, LMR, the HOTTEST set-up to date, is the 5-T FAI Astro Geared Stage V. I have tested this motor with a 14x7 Aero-Naut carbon fiber prop, 42mm yoke, and on 7 1700 SCRC's, soldered end to end in a 4/3 flat pack. I was using Steve Neu's FAI 7 - 18 cell ECS for this test. The initial thrust was 84 oz. and dropped down to a fairly steady 78 oz. I did not record the amp draw, though I'm sure it was in the upper 50's. These test readings were confirmed by the customer on a different test stand. This is real power, and in a 34 - 42 oz. glider, you'll have better than a 2:1 thrust to weight ratio. It should be noted that this is for 30 - 45 sec. runs, only, and flying, not bench testing. Additional cooling for the motor is also necessary via a cut out end bells. The timing will have to be advanced about 5 amps, above the no load neutral timing reading. For class B, use the same motor and switch to 9 - 10 1000 ma cells, and go down in prop size to a 12x7 for 10 cells and 12.5x6.5 on 9 cells. These are good starting places. This is for 20 seconds! 30 at the most! Any more, and you will overheat the commutator and it will be out of round; your performance will drop off.

While on props, if you will spend an hour on tapering the trailing edge and blending it gradually into a sharp edge instead of the chisel point they come with from the factory, you will be rewarded with even more thrust and less noise. Other areas that need attention are the tips. They should be symmetrical, and the leading edge casting should be removed by scraping an X-acto knife or razor blade, and then sanding lightly with 400 grit sandpaper. Once you have the desired shape, it's time to check balance.



On an Aero-Naut prop, lightly snug the bolts to hold the blades in place. Lay a straight edge against the back side of the yoke. Now move the blades back 'til the tips touch the straight edge on both sides.

On Sonic-Tronics, use small strips of masking tape the same length to hold the blades in place. This is vital to obtain a true balance. This will prevent the armature from oscillating up and down causing the brushes to bounce, leading to premature armature bearing and brush wear.

Now how to balance the prop without changing the shape? I have started using clear Krylon spray paint. Just wrap a piece of newspaper around your hand and hold the yoke. Apply a coat or two to the light blade. This will add weight. Allow it to dry for a while, then recheck the blade position and balance repeat, as necessary. Remember, that as the thinner evaporates, it will become slightly lighter. I would also advise, if you have thinned and shaped a carbon fiber prop, to spray several coats on both sides of both blades to protect the surface, lightly sanding with 600 grit between coats to smooth out the fiber ends.

For those who have 6 turn FAI motors, Lowell Howe has been experimenting with using the 14x8.5 monster Aero-Naut prop. Early reports seem to indicate nearly equal climb out. (Don't try this prop on a 5 turn unless you like fried armatures with a side order of burned brushes for lunch.)

Another alternative for smaller planes is the FAI 035. In tests on modified S-turn, I find that 035's only put out 4 oz. less thrust than the FAI 05. They are cheaper, 1 1/2 oz. lighter, and shorter. Run a 13x7.5 Sonic-Tronic prop on 7x1000 ma batteries and hold on. It will go vertical. Lowell has an older style Stage-V S-turn FAI 035 in a modified Mini Challenger, and has recorded climb outs of 1060 feet in 35 seconds, measured with an altimeter watch. Now for those who run direct drive FAI-05-15 who want a little more, try using a

9.5x5 Aero-Naut instead of the usual 8x5. This will draw around 45 amps or so, and increase your climb out. (Use only for 30-45 second bursts.)

Now for some other interesting combinations. For All Up, Last Down, John McCullough of Raleigh, NC has developed a, so far, unbeatable combination. He uses a 28 turn Leisure motor / 3:8 gear drive, and Graupner's 14x8 super thin blades. To use these, you must modify an old Master AirScrew or Sonic-Tronics yoke, or make your own. This is hooked up to 12 x 1700 Panasonic cells, 4-3 cells wired in a series parallel switching circuit with a micro switch for a brake. In series/climb mode, the motor sees 6 cells, in cruise mode the motor only sees 3 cells, and all 4 packs are in parallel. That's 6800 ma, and he says it will motor fun for 1 hour and 55 min. He's won the KRC All Up, Last Down, for the last two years that I know of, as well as the Gulf States Fly In, and numerous others with this set up. He's using a 90" sailplane to house this battery warehouse, with 900 sq. in. wing area.

Here's a combo that's my favorite. For small sport planes, try running an Astro 15 direct drive with an 8x4 Top-Flight white nylon prop with 12 x 800AR Sanyo's. The weight is only two ounces more than 7x1400's. You'll get 5 min. + flight time, with much more power than an 05. This is what I have in my modified Sterling Corvair, 36" span, approximately 280 sq. in. wing area, and 41 oz. It really moves. Try it in an Aero Craft Apache, and blow an Electro Streak away.

That's all for now. If you have a great combo, I would love to hear about it, or any suggestions. Please contact me by phone or write. 'Til then, God's best to You!

This article was written by Kirk Massey, New Creations R/C, P.O. Box 496, Willis, Texas 77378; (409) 856-4630, 8 am - 10 pm, CST, Mon. - Sat. (Not all of the items and services mentioned above are available through New Creations R/C.) ■



## Jer's Workbench

### Travel Kit

Well, with this writing I'll be on my way to the WSJ in Richland, Washington soon, and because I'm taking several gliders in hopes of getting in a full week of flying, I feel that it would be in my best interest if I prepare myself a travel kit. The kit is in addition to my regular tool box which contains miscellaneous small hand tools, extra wing tape, and a bit of lead which comes in handy for weekend flying.

The travel kit is full of some miscellaneous items that I will need and some items that I hope that I won't need. I would like to share this list with you. Maybe it will help you on your next trip; as for myself, I will probably still forget something. (My traveling list starts with gliders, radios, tool box, chargers, and then the travel kit.)

- An extension cord is a must! Some motel rooms only have one receptacle located in the bathroom, which can be very inconvenient at times. Also, if more than one radio needs to be charged, you may find yourself having to unplug all the lights, TV and radio, if you can, that is. As Ed said of one trip last year, "It was like living in a cave with little LED's staring at you..."
- In case I need to repair something, I included 5 & 30 minute epoxy, mixing sticks, something to mix the epoxy on, and paper towels for clean up.
- Along with the epoxy I have included some CA glue, T-pins and masking tape. Talking about tape, an extra roll of hinge tape, plastic wing tape and a roll of duct tape may come in handy.
- Extra hand tools include a hobby knife, hand saw, hand drill w/bits, file and

sandpaper. Anything else can be purchased at the local hobby shop or hardware store in Richland.

- For my comfort I will be taking along my first-aid kit, sunscreen, sunglasses and a hat. A sun tent will be used at the sod farm, and a ground tarp at Eagle Butte. For a little bit of extra comfort, there will be an ice chest and cooler along with folding chairs. (No, I'm not that young, so I won't be renting my chair out!)

Having made several trips to Richland, Washington before, I will take several types of clothes. It could be cold, windy and raining, or it could warm, sunny and hot. And all on the same day!

That's about it, but I know that I will still forget something... Let's see. Ice for the chest, can opener... And don't forget to pack your wing rods! Hope to see you at the WSJ! (Change the battery in the van... Finish the Ornith... Mow the grass...) ■

## Electronics News

...from Modesto R/C Club Newsletter, *Thermal Topics*, Dave Darling, Editor, Modesto, California

"Another note of interest is a follow-up to last month's article on problems with Airtronics radios with the so-called "Rubber Ducky" antennas. George Steiner, our AMA District 10 electronics expert, stated that the Airtronics programmable radios are set up so that the radiation pattern (power) of the transmitter increases the closer to the tip of the antenna. He demonstrated this with a signal strength meter. Therefore, if you put one of these flexible, short antennas on, say a Vision or an Infinity 600 or 660, the short antenna is radiating back into the transmitter and could cause loss of memory in the transmitter. Futaba and JR radios do not use such a wave pattern, and so are probably more likely to be immune to this problem. So, as I related in last month's newsletter, the use of any antenna not provided by Airtronics voids the warranty on the radio system. So, be warned and beware!" ■



ZIKA

## Atlatl-Assisted Launch or Hand-Launch Topics

...by Scott Smith

2 Sugarpine, Irvine, CA 92714  
(714) 651-8488 evenings after  
7:00 PST

### Alternative Launching Techniques

Kudos to all of you who have sent in suggestions for alternative launching techniques. Some real dudies.

#### Atlatl

I just had to put this one in a title twice. First prize for primitive technology MUST go to Bill Poythress of Saugerties, New York for suggesting the use of an atlatl, or ancient spear thrower. Essentially this is a leverage stick that increases the throwing radius. With this you could get two arms into the launch effort and accelerate the glider during a longer arc. Bill left it to me, and I will leave it to the reader, to devise a connection and release scheme for the atlatl-glider interface.

The potential for awesome launch heights makes this technique intriguing.

Of course, the disconnect has to be reliable. Contemplate, for a minute, the scenario if the disconnect doesn't happen. Picture the pilot exerting full double-arm overhead effort on this stick while loudly grunting some martial arts expletive. The glider doesn't disconnect. Imagine the kinetic energy of the glider as it enters nearly vertically into the ground at the end of the atlatl.

I recommend that someone take a video in case this misfortune occurs; I would pay money to see it.

But the idea is intriguing: simple, great launch height, great mobility in contests, less stress on one arm, etc. Simply need

a foolproof disconnect. Help, anyone?

#### Use Other Arm

Some wise guy just had to write in to say that if one arm is kaput, then use the other arm. Bill Leahy of Fremont, CA, wrote in to say that "... you <i.e. the author> are hooked on hand-launching enough to

- Analyze the throwing motion from the right side.
- Apply the same motion to the left side.
- Start very easily and give yourself a couple of years to develop the coordination and strength.
- Once the right shoulder has recovered, be a switch-hitter so one side doesn't take all the heat."

and I quote.

Unfortunately, I am like that man whose dearly beloved wife died. His friends tried to console him, saying that it was okay and in time he would meet another woman and everything would be fine. Upon hearing such nonsense, he sputtered and retorted: "But what am I going to do tonight?"

#### How to Warm Up

All of you have heard admonitions to warm up before throwing, right? How many of you know how to warm up? I confess, I didn't know. I just sort of threw real easy several times, feeling like a wimp and an idiot. After all, when the plane flies 10 feet and falls to the ground, I wondered if spectators understood what I was trying to do. Or not do.

In any case, Bob Harold AGAIN comes to the rescue with the following warm-up procedure (which he wrote for *R/C Report* and was picked up by other magazines as well):

1. Vertical Arm Circles. Stand with both arms stretched out sideways. Start with small arm circles, gradually increase to larger circles, then return to small ones. Do about 20 circles. Repeat in the opposite direction.
2. Front to Back Arm Swings: Stand

with both arms stretched out sideways. Swing both arms forward and backward about a dozen times. Wrap your arms around yourself and give yourself two strong hugs.

3. Horizontal Arm Circles: Bend over with knees slightly bent and place your left hand on your left knee. Your right hand should hang straight down. Start with small horizontal circles and gradually increase to large, then back to small again. Do about 20 in each direction. Change arms and repeat. This can be done with a small dumbbell weight also. This exercise is also good therapy if your shoulder is already sore.

Then stretching: Arm pull across your chest. Put your right hand across your chest and under your left arm. With your left hand, grasp your right upper arm at the elbow and pull towards your left. Hold for ten seconds when tight pull is felt. Repeat with other arm.

Finally, gradually work up to maximum throws. Try using a football to begin throwing. Start out easily, and gradually increase distance as your arm warms up.

Thanks also to Bob Baker of Eastern Iowa Soaring Society for sending a copy of Bob's exercises.

#### Hi-Starts

Ray Hayes of Washington, Michigan, wrote to describe a 1.5 meter contest as follows:

"Concept: Inexpensive way to enjoy R/C soaring. Simple polyhedral, two servo model is a winner in this event. The contest moves quickly, therefore contestants will fly a large number of flights.

"Format: Frequency distribution permitting, man-on-man group launching from identical hi-starts. Rounds can vary in time from two to fifteen minutes. One launch per pilot per round. Any number of models may be used. Landing skill task is LSF levels one and two. Man-on-man contests were originally designed

to have the winners of each flight groups fly against each other in subsequent rounds. This format promotes a higher intensity of competition among all entrants. You will generally fly against persons with your same skill level and this makes the contest exciting for everyone because if you're a novice you don't have to fly in the same group with an expert. Likewise, if you're an expert, this format will determine the best expert.

"Specifications: Model's projected wing span cannot exceed 1.5 meters (59.5 inches). Hi-starts will have 30 feet of rubber with 120 feet of line and stretch approximately forty paces.

"Scoring: A point per second after two release plus sixty points for LSF level two landing or thirty points for LSF level one landing.

"Organization: A) First round flight groups are chosen at random or by skill class. All subsequent flight groups are based on position of placement in the previous round (i.e., 1st place flies against other 1st placers, 2nd place against other 2nd placers, etc.). B) Identical hi-starts are used. C) A red line to which the hi-starts can be stretched to is utilized to insure fairness in launching. D) Group flights start and stop with an audible signalling device. F) Organizer calls off launch sequence and pilot must launch immediately. G) Pop offs are an official flight and not relaunched. H) Flight time ends when group flight time expires. Zero time and landing points are received if model is still airborne when group flight time ends. I) Flight time starts at moment of tow release and stops upon touching ground. J) Ties for first through third at the end of the contest can be broken with a fly off. K) One landing tape designated with LSF level one and two can be used to determine landing skill points. L) Wing spans will be measured for compliance.

Ray has scheduled several contests in

this format; see the contest section for dates and locations. Most impressively, Ray has oriented this activity towards youngsters and beginners.

### WINGS Award

Ray has also implemented a series of awards for 1.5 meter airplanes at six levels of difficulty:

1. six flights of two minutes.
2. six landings in a ten foot diameter circle
3. six flights of four minutes
4. six flights caught in your hand
5. two flights of six minutes, one to include three consecutive circles while flying inverted and one to include one horizontal roll.
6. two flights of eight minutes, one to include a double Immelman and one to include a cuban eight.

Aspirant may declare all of his flights hand-launched or launched with a hi-start whose rubber component cannot exceed 30 feet relaxed and whose tow line cannot exceed 120 feet.

If this appeals to you, send \$2.00 cash, stamps, or check to Ray Hayes, 58030 Cyrenus Lane, Washington, Mi. 48094, to receive your WINGS program voucher.

Ray, all I can say is your plate is full. Best wishes, and write me micro-dramas about contestants' experiences. Sounds like a lot of fun.

### Next Month

Coverage of the 11th Annual Riverside classic.

Thanks to all who wrote with condolences on my defunct arm. It is getting better, and I will be participating this summer. ■

## Emergency Bellcrank

...by George G. Siposs  
2855 Velasco Lane  
Costa Mesa, California 92626

It is midnight, and you have broken the plastic bellcrank that came in the kit and the contest is tomorrow morning. Give up? No! You can easily make a bellcrank from sheet metal.

It is best to use aluminum, about 1/16" or .075 thick. (For small models even a flattened-out beer can would do.) First, make a template from cardboard, bend it into shape, and modify it so you understand how it works and how it will fit your model. After the metal is bent to its final shape, insert a block of wood between the two sides and drill the holes across. Epoxy a brass tube for the main pivot, this makes the structure stiff and reliable. You'll be surprised at how rigid this design can be. ■



Cut out shape

②



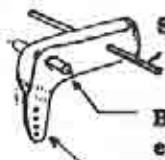
Bend it

③



Drill holes

④



Steel Wire

Brass tube epoxied in

Holes for pushrod

## NASSA News

### My Buggy

A Letter to Wil Byers

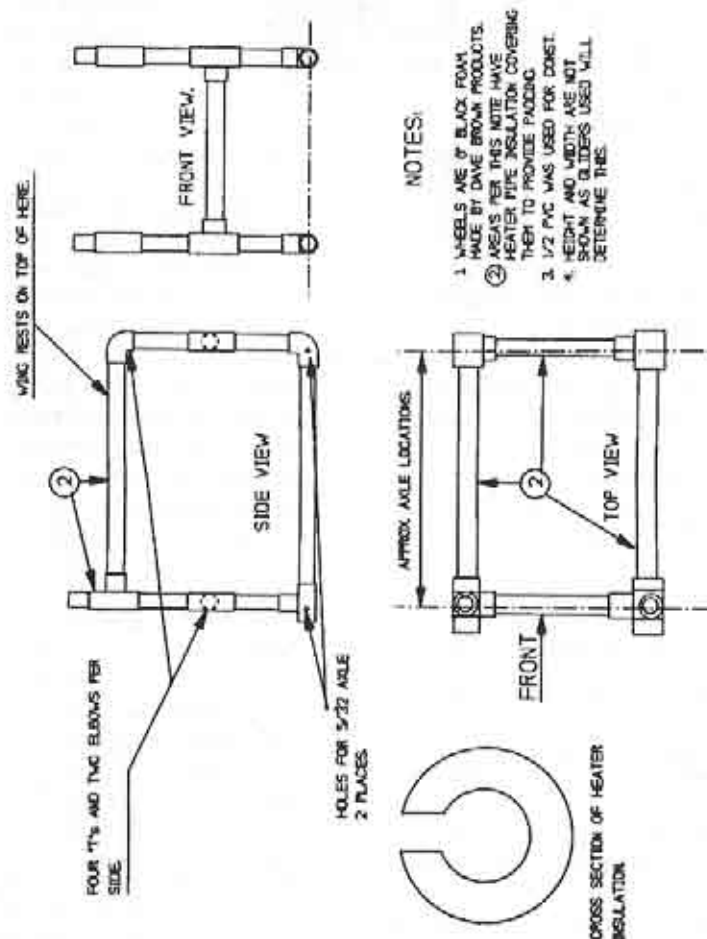
Wil,

Please find enclosed my order form for one NASSA T-Shirt and one year's membership dues. This is one of my birthday presents from my family. I have also enclosed a rough sketch of the buggy I use to launch my larger gliders on. I am sending the sketch in response to the question generated by Gregory Vasgerdsian in the October issue of RCSD. I would be more than happy to send a video of the buggy in

use, if required, to clarify things. I use the buggy for winch launches as well as aero-towing. I still have not gotten the photos developed of the metal molds we made. SORRY! I would like to thank you for all the questions you have answered for me and the time it took. Please keep writing the nice articles and I don't mean to be a pest with my questions! I have a great desire to learn what I can.

Sincerely, (signed) Donell Johnson

Thanks for sharing the sketch! Ed ■



NOTES:

1. LABELS ARE OF BLACK FOAM MADE BY DAVE BROWN PRODUCTS.
2. ASKAS PER THIS NOTE HAVE HEATER PIPE INSULATION COVERING THEM TO PROVIDE PADDING.
3. 1/2 PVC WAS USED FOR DONUT.
4. HEIGHT AND WIDTH ARE NOT SHOWN AS GLIDERS USED WILL DETERMINE THIS.



## On The Air With Cornfed

Fred Rettig  
1778 S. Beltline Highway  
Mobile, Alabama 36609  
(205) 471-2507 (days)

### The Couple Dozen Club

Well, I guess it's my turn to put my two cents in about hand launching. After all, everyone else has. I guess the first time I heard about hand toss I thought we were going to throw horse shoes or load a watermelon truck. Boy, was I in for a new thing! So, here I go, and this is where the title of the article comes in.

Now, the Couple Dozen Club is a club whose members are held and registered in silence. You just know you are a member. For you slow learners, I'll spell it out. A Couple Dozen Club member is one who has torn up, wiped out, crumpled up or taken out at least a couple dozen of them addicting little hand chunkers. (That's what David Layne calls them things.) Has the light come on in your head yet?

Anyway, here are some of the ways you might have become a member:

- Possibly circling around downwind on a "no lift" day.
- How about those automatic poles that just pop up out of the ground from nowhere?
- Or, those fences that run forever?
- Maybe it was a battery that only lasted for four hours.
- Hey, did you ever launch one right into the ground?



- Have you ever forgotten to turn it on?!
- You could blame your friend for parking his car in the wrong place.

The list could go on forever. But, whatever or however, you know now whether or not you belong to this silent organization. Welcome aboard and congratulations!

This club is growing larger by the day. There must be thousands of us. Perhaps I will introduce the official se-

cret hand shake for club members only, soon.

Moving right along, I have come to realize that not everyone wants to be nor has what it takes to be a member of this club. I will, therefore, offer some first hand suggestions as to how to stay out of the club.

- 1) When building your plane, choose one that will work. There are many hand launch planes out there, but only a few work well. The bad planes fly right through the lift and tell you so. But, just try and turn that dog. It will fall all over itself and you, in your frustration, will move yourself ever closer to club membership. I hate to say it, but \$5 airplanes don't fly low to the ground well!
- 2) Trim your plane; true the plane up stab to body, wings to body. Check the alignment of stab to wing. I guess I'm trying to say "incidence". The way you will know when this is right is when you fly and trim the plane. When setting the stab, just tack glue it to the body. The alignment for the stab can be drawn on

the plans for your plane using the side view from the plans. This will show you on paper what the alignment of the stab to the wing should look like. Take a straight edge and draw a line as true as possible through the stab, along the body to under the wing. This will only work if the body, on paper, is to scale with your wood or glass body. Maybe the line will be a quarter of an inch below the leading edge of the wing. So, try to take the straight edge and run it down the actual body, and mark it.

Does any of this make sense? Hope so. Once marked, set the stab in place using a straight edge and try to glue the stab on so it will be looking at mark on body. Build it to what looks about right. Then, go fly. Not too much flying; just test it out. Now go back to the workshop and make any necessary changes. Remember, I said just tack glue the stab on; don't forget to take thin ply for shimming the wing.

There are things to watch out for on bad trimmings. If the plane flies too fast, the front of the stab might be too high. If the plane flies too slow, the stab could be too low. To correct this, shim the wing trailing edge, or move the front of the stab up. When all is well with the stab, and your plane flies flat and smooth, then beef up the tail surfaces with balsa and glue. Keep your plane as light as possible; try to keep it under 16 ounces.

- 3) The Flying Field - Try to find a field at least 300' or 400' by 200' or bigger. Now this might sound crazy, but I personally think that every field has a sweet spot. It will be up to you to find it.

Let's take a field that has a tree line on the north and south sides, while the east and west lines have trees

and buildings. Now, the south side has an opening in the middle of it that leads to a parking lot. Stay with me. Try to picture this. The wind is coming from the north. (Oh, by the way, there is only about 300' between the north and the south.) Okay, here we go. You go into the field and get close to the north tree line and start launching. The plane goes up, but only to get bumped around, and all you are doing is fighting the plane. So, you back up to the middle of the north and south line and start launching the plane. This time, it wants to fly up much higher on launch. It acts like a salmon swimming up stream as it jumps over the turbulent waters. What has happened in the field is that the wind comes over the trees and flows downward, probably about half way across the field and then it bounces off the field and heads toward the south tree line. It comes in and then heads out again. The reason for bad flying on the north side of the field is that you are under the flow of wind. You were launching in the under-current; we just don't have arms to throw high enough to get on top of the flow. When you backed up to the spot, the plane launched higher and got on top. This gave you the opportunity to search for and find lift.

It helps to remember that wind and water are alike in that they both flow and will find the easiest way to go, whether it be up and over or down and around. Okay, you are on top of the flow, and you hit lift. You start climbing and heading downwind to the south, but will you have the height to clear the trees and climb out? Maybe. But, can you make it back? Stay with me. Remember, the south side of the field has an opening. Also, keep in mind that the

wind will flow the easiest way possible. So, you are in lift and you are standing in the field so that the opening is right behind you. The heat and wind will funnel through the opening more so than just in the field and out. It will actually turn and flow to the opening, and that is where you want to try to be when taking the lift out and over the trees to higher heights.

There is no way I can explain the whole situation. It will be up to you to figure out your field and conditions on each day you fly. The best thing you can do when you fly your field is not to stand in one place. Move over the field until you find the spot that is right for the best results. Your goal is hooking up with a thermal and getting out of the field.

### Bisquits in the Oven

...by Cornfed

Bisquits in the oven, clouds in the sky  
My, my, my, it's too bad to fly.

Baby is on the floor  
Dogs droolin' at the door;

When will we be able  
To have them bisquits on the table?

Not now, son  
They ain't yet done.

Coffee in the pot  
It's good and hot;

Bacon and eggs poppin' in the pan;  
My that grease sure burns the hand.

Lookin' through the window, bisquits risin' high;  
Black clouds moving fast in the morning sky.

Now we've all gathered 'round  
For bisquits golden brown.

Standing hand-n-hand  
We give thanks to the man

That we are able  
To put them bisquits on the table.

- 4) Quit circling at low levels. Now, if you are below ten feet and start climbing, that's okay if you are in a contest, or if the climb is great. This is the norm for myself. If I hit lift below ten feet, and I just don't seem to be climbing like I think I should, I bring the plane back as quick as possible and relaunch up on top of where I just left the lift. This gives me a greater height to circle in, as well as a larger core to circle in.

If the wind is blowing, you will need to launch into the wind, turn on top, and then go and find the lift you just left. In a breeze, you might want to fly the plane a little faster for more control.

- 5) Overview - Pick a good plane that works. Build it right and trim it out for best flying ability. Find the sweet spot in your field. Learn it well. Make good decisions as when to

circle and when not to. You will have to take some chances if you want to become good at hand launching. As you become experienced, your planes will last longer. Just remember, it's all in the name of fun.

Here are some planes that I recommend: Climmax, Saturn, Monarch, Aria, Vertigo, and Chuperosa.

### Signing Off, Cornfed

P.S. Say your prayers and telephone an old friend.

Attention: Pat McCleave of Wichita, Kansas. The bill we ran up at the corner grocery store while you were here is overdue. The owner is starting to ask questions. What should I tell him? ■

## My High-Tech Tree Locator

...by Dr. (Doc) Ameil Klein  
Maarheckstr.20, D-54668  
Prümzurly, Germany

*There is, of course, no such device. But my eyes and the eyes of others said there definitely was something taking my model out of the sky every time I got way down range over the woods. (Where else?)*

### Part I

Our weather's hardly Texas-like. So far, that is. But it's getting better. It's good enough, in fact, for some excellent flying. I went out a few days ago with my new glider to see if it would fly as well as I wanted it to. It did. I was pleased. But I got carried away. Actually, it was the airplane, not I, that got carried away. On the last flight of the day (*We were taking it aloft "piggyback" — into the clouds on the back of a large gas powered model.*), the model got so far downwind it couldn't be brought back without a stop along the way. Unfortunately, the stop was in the woods at the end of our flying site. It seems my fantasy secret-weapon — an on-board **tree locator** — worked great! It does just what it's supposed to do, find a tree. This time, the locator found the highest glider-destructing tree on the side of an almost inaccessible hill. Isn't that wonderful? Then it placed my model deep in the bowels of that botanical barb, with an accuracy F-16 pilots dream about. It was pin-point — with, fortunately, more pins and points than my glider could handle.

Tree locators like mine can do even more. They're really high-tech. Not only do they find trees, they also keep models off the wet German ground. Really, they prevent models from hitting mother earth. (*If I ever market tree locators, I'll say they're "the little mothers" that find trees.*) After my locator allowed my model to make its barbed decent through the branches of the tree — that wonderful,

big, inaccessible tree it had located for my glider and me — it stopped everything.

Stopping everything wasn't easy. Because space was so tight among the branches of our tree, the detector had to **disassemble** the airplane. Being very tidy, it hung components like Christmas tree ornaments here and there on various branches. Not being high-tech myself, I'm not sure what the tree locator's logic was. I guess it wanted us to spot the glider with ease when we got to it to turn off the receiver. Technology never ceases to amaze me.

Anyway, time has passed and the airplane has been **reassembled**. It took days to reverse the complicated high-tech process the tree detector accomplished in seconds. Fortunately, with the exception of the fiberglass fuse, my new glider's components are all typically me (low-tech?) built-up, making it time-consuming, but easy, to undo even a high-tech disassembly.

The next time we fly — probably late this afternoon — we'll leave the tree detector at home. I don't climb trees very well. But I do own a pair of rubber boots. So, I'll just fly over the newly plowed, muddy fields.

### Part II

Teasing aside, I told you about my **tree locator** in the last letter. There is, of course, no such device. But my eyes and the eyes of others said there definitely was something taking my model out of the sky every time I got way down range over the woods. (*Where else?*) I dropped the airplane in the botanic the first time, and after I repaired it, a buddy who flew it did the same thing. Now that's frustrating.

Convinced there was something wrong with my new top-of-the-line Multiplex (*After all, the airplane was not doing what it was supposed to do.*), I returned the transmitter and receiver to the company. Here in Germany, Multiplex has a reputation



for first-class service. I wanted them to prove it.

The factory technicians checked out the equipment, found nothing wrong, and told me — more tactfully than stated here, of course — “The box is OK, Doc. The problem’s with you guys pushing the sticks.” Egos, as you can imagine, don’t accept things like that lightly.

With the airplane repaired one more time, and starting to show the signs of its botanical encounters, we tried once again. This time, I took my friend Walter with me. (You’ll be hearing lots more about “my friend Walter” in the future. He’s Walter Gerten of Germany’s SMG. The letters stand for “Segelflugmodelle Gerten”. You’ve seen the company name, I’m sure, in lists of this country’s kit manufacturers. “Manufacturers” is perhaps overkill. SMG’s a one-man operation run from a barn on top of a mountain.) Anyway, when we got to the site, Walter checked out my equipment and said, “The Multiplex guys may be right. Your equipment may check out OK, but there’s interference at your airplane. It’s definitely not doing what we’re telling it to.”

The problem? We’re still not certain what it was. But thanks to Walter, it’s solved. He said, “You know, it could be your antenna. Although your fuselage is fiberglass, and it’s normally OK with glass to run an antenna internally, that may be the cause of your interference. That may be your problem. You’ve got stabilizer and rudder cables running almost exactly parallel to your antenna. That could be bad. Let’s hang your antenna outside the fuselage.”

We did. In a minute we had a hole poked in the fuselage and the antenna hanging like an overcooked spaghetti (Is that singular of spaghetti?) out in the mid-day air. The glider flew faultlessly. Full control. No further interference. Even over those ominous trees down range almost out of sight.

The solution was that simple. I know

everyone understands the reasons for not putting an antenna inside a fuselage that contains carbon fiber. And I think most people probably know about not running an antenna parallel to steel of any kind. But not me. There I was blithely crashing and repairing my airplane — all the while mumbling unkind, unrepeatable words at my new Multiplex transmitter — until my friend Walter spotted the possible problem. And offered the probable solution.

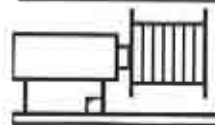
The moral of all this, I guess, is **Be smarter, Doc**. But that’s not possible in my case. I can’t change who I am. Or, if you’re lucky, as I certainly am, you have a friend like Walter, a person who eats, sleeps, dreams, thinks, and lives sailplanes. And you go flying with him. Hang around his shop. And ask a lot of questions. I’ll bet I could fill a book with what I’ve started to call “tips from my friend Walter”. Walter, by the way, has put a lot of what he knows on a diskette that he sends free for the asking to his customers. Unfortunately, it’s all in German, making it pretty useless to most RCSD readers. But maybe translations of some of it would be interesting.

Although he’s able to support his family with the income from his kits, Walter, I’ve noticed, gets his greatest reward when a builder of one of his airplanes calls from someplace like Tokyo or Madrid and says, “I’ve just built your so-and-so and it’s great.” It’s nice to know there are still people in the world who are more interested in delivering quality than in making money.

And, finally, with the chit-chat out of the way, wanting to do my part, let me offer my services to RCSD, if you ever need them. My company prepares English for high-tech German industries — handbooks, operating procedures, reports, assembly instructions, technical guidelines, and so on. We’re a group of professionals who translate industry-specific German to English. Our rates

are much too expensive for model airplane cottage industries, although they’re merely the industry standard. But I’m always willing to help fellow model builders.

Working on my time, I’ll always help another model builder. So if you or RCSD readers ever need help with German instructions, let me know. If the job appeals to me, I’d do it for a bag a’ balsa, a pot a’ paint, a gob a’ glue, a subscription to a newsletter, a kit — stuff like that. There’s certainly a need, for clear straight forward English, isn’t there? So much German-prepared “Englisch” is written in what my people call “90% English”. It’s not always as funny as the



## Winch Line

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

### Pro-Case Shipping Container

A group of local flyers do quite a bit of traveling to contests around this part of the country and over the course of time have encountered every known airplane transport problem imaginable. They started off with the basic “throw it in the trunk” mode and then they progressed finally to a container on a trailer for those contests where they could drive. This system worked great as the airplanes were nestled in a safe container on the trailer; the vehicle was free for passengers and individual baggage, and more folks could share the ride to the contests as well.

As time went along and the boundaries of their sorties to contests increased the transport crunch now came when shipping planes to a contest when flying commercial to a contest site came into play. Using boxes of wood or corrugated

European hotel sign that said, “We invite you to take advantage of our chamber maids,” but strange, nevertheless.

Regards from the Prüm river valley in the middle of German-Luxembourg Nature Park, where the rains are finally abating, where the thermals grow big and strong at this time of year, and the old men who inhabit our valley... Oh well. It’s called aging. There in the States you have “senior citizen discounts”. That’s at least some compensation. ■

*Thank-you for your generous offer to help translate German to English. Occasionally, we do wind up with something that we would like translated. We’ll keep your offer in mind and have now shared it with all the readers.*  
ED ■

kit boxes meant a great deal of time packing the individual pieces in foam or bubble pack and then packing them in the container to prevent damage by the air carrier or UPS. The idea being the airplane would arrive at the contest site in one piece and be flyable upon arrival. This was firstly a hassle to spend all the time required to initially pack the boxes to prevent damage with all the cutting of foam or bubble pack, and finding the best way to load the box. This was needless to say for those who have done it is not a pleasant experience on a good day. Plus you hoped that the the airplane would survive the journey and be flyable at the other end of the trip.

Then there was the problem with damage to the shipping box during the initial flight to the contest. When you are on your home turf during the week this is not that big a deal; **BUT** when you are out-of-town on a weekend it becomes a nightmare. Add to this the storage of the packing material in the motel while off at the contest. (Yes, some motel cleaning crews will try to throw out everything but your clothes, and have!) The end result is a situation that borders on insane.

After a trip to Phoenix, Henry Bostick





of transmitters. Plus the chargers will fit nicely in with the transmitter so you don't forget to charge at that out of town contest and become the butt of many remarks.

The end result of Henry's labor is a set of

shipping cases that fit the bill for the traveling modeler. In fact, he spent several weeks looking at various alternatives that would satisfy the basic transport problems, be simple in solution, and not cost your first born in the process. After much research and numerous deadends, Henry contacted a company that produces containers for musical instruments. With rough sizes and a few days of negotiations a deal was struck on a set of cases that would fill all of the transportation needs of the traveling modeler. And as they say, Pro-Case was born.

The prototype case was designed to hold one to two Open class sailplanes that would fit UPS shipping dimensions and strong enough to withstand the abuse of shipping (read UPS). Extruded aluminum along the edges and stainless steel corners with colored vinyl sides, top and bottom. For good insurance it was built with tongue and groove interlock top and a full length piano hinge. Inside, instrument grade foam is used to provide piece protection, with the ends divided in one inch increments so that the case can be compartmented to provide custom dividers for wings and fuses. The flush mounted handles on the ends and top make carrying easy and the end handles provide a means to strap the case on a roof rack as well.

Not to stop there, Henry even designed a handy little transmitter case as well. (Henry is always one to over do things.) This case matches the construction of the sailplane cases and will hold two transmitters in safety. Just the thing for traveling with a couple of planes and a couple

shipping cases that fit the bill for the traveling modeler. The SPC-1 case is for 1-2 Open class sailplanes for \$229, the SPC-2 case is for 2-3 Open class sailplanes for \$249, and the TXC-1 transmitter case is available for \$65. These cases come in standard colors of Red, White and Blue; but you can get other colors (plus multiple colors) for \$10 more. If you want a special size, that can be arranged on an individual basis. Pro-Case is available exclusively through: Mikes Hobby Hanger, "A Place To Hang Planes", 1740 South I-35E, Carrollton, TX 75006, (214) 242-4930 or Henry Bostick, 5517 Hidalgo Court, Garland, TX 75043, (214) 279-8337 (eve). ■



ZIKA

#### An Observation

A visiting flyer in California recently observed, "Work is the curse of the modelling class."

Called in by Phil Lontz, San Anselmo, California.

## Static Testing of Wings

George G. Siposs  
Costa Mesa, California

It is a sad sight when a wing blows up during a winch launch or in a tight turn over a slope. In the resulting crash not only the wing goes but the entire plane may be destroyed, including the radio. Full size planes test their wings before they take to the air so why don't we test models similarly?

A high-start or winch launch line can easily have 30 pounds of tension (pull) in it. In a tight U-turn one can easily pull up to 10 G's. This means that the wing will have to withstand bending and support a weight up to ten times the weight of the model. It is fairly simple to test your wing on the bench quantitatively (i.e. not just by "feel") so, if it shows signs of failure, you can strengthen it without losing the entire model.

Fill small plastic bags with sand. Wet sand is better because it is heavier and can be shaped easier. Weigh each bag, make sure they all weigh the same or mark their weights on the bag.

If it is a one-piece wing, place it upside down on a table with a strong support under its center only. If you use plug-in wings, assemble the fuselage and wings and place the entire structure upside down on the table, with a strong support under the center.

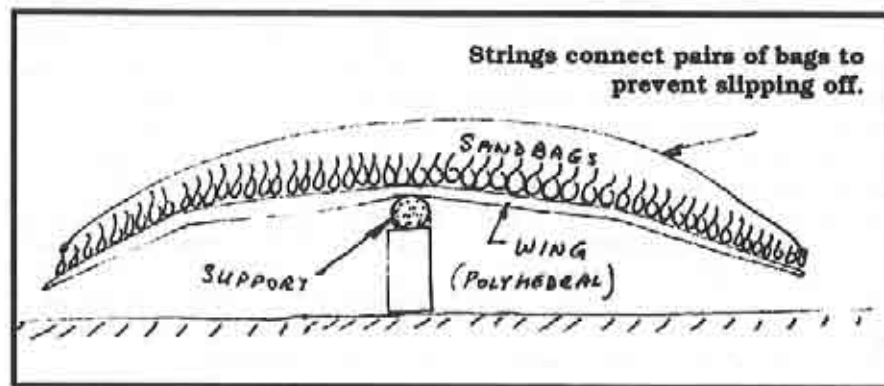
The support should have a deformable surface, such as a sandbag, to conform to the shape of your structure rather than imposing a concentrated load which may damage the balsa sheeting or plastic.

Multiply the weight of your completed model by a factor (say, 8 or 10 or whatever G's you want to test for), and prepare sandbags equivalent to that calculated weight. Some models may need 30 pounds distributed in several small bags.

Wings in flight are designed to withstand a uniformly distributed load so the bags have to cover the entire surface. If the wing planform is tapered, the bags must not overhang, they must uniformly cover the wing. If the wing has polyhedral or steep dihedral, the bags may slip off so you should tie pairs of bags together and place them equidistant from the fuselage on each wing panel.

Load the wing gradually by layers so that you can tell at what point failure begins to occur. Incipient failure is indicated by the sound of cracking or extreme bending.

After you test and strengthen the wing, you'll be able to fly more confidently. For modern planes and flight maneuvers, I think a 10-G loading is minimum. For old single-spar models that were intended for hand launching or running high start, probably 3 G's were max. Do you agree? ■



## Beginner's Corner

### Finishing Wood Wings

© Copyright 1994 by E. H. Jentsch

...by Ed Jentsch

2887 Glenora Lane  
Rockville, MD 20850-3052  
(301) 279-7611

Inspired by a series of questions posed by David Fruehwald,<sup>1</sup> this article responds to this set of questions:

"What are some of the best ways to finish wood wings without destroying the core underneath?

- Chemicals used to finish wood
- Sanding techniques for an ultra smooth finish
- How not to ruin the airfoil while finishing the wings"

We begin by quoting a long forgotten Neanderthal proverb: "A wood by any other name... is still a wood." I state this hallowed ancestral adage for no particular reason beyond its penetrating insight into one of life's fundamental mysteries.

Let's start at the top of David's list and work our way downward. We will show how to damage wing cores, examine several methods of finishing wood sheeted wings along with their pro's and con's, and finish with sanding and its sibling topic, ruining airfoils.

#### Damage and its avoidance

Four things can damage foam wing cores: heat, foam-philic chemicals, excessive mechanical force, and tidal forces generated near a black hole. Unless your workshop resembles my friend Bunky's, only the first three are actuarially significant to the field of model building.

High temperatures can melt foam wing cores. However, the only intense heat source they normally meet with is a plastic film covering iron, and then only after being sheeted with wood. That's fortunate because wood is an exceptionally good thermal insulator. So, unless you set the iron's temperature much too high, or dawdle when covering the wing, the

risk of thermal meltdown is almost non-existent. I know of no one who has melted a core with a covering iron. Of course, if someone did, would we expect them to advertise it?

Certain chemicals will also melt foam - lacquer, for example. Simple precautions suffice to spare us this embarrassment. First, test any intended finishing chemical on a scrap of foam. Then, if the chemical eats the scrap, assume it will not discriminate between scraps and non-scraps, and do the following:

- Fill all gaps or holes in the sheeting, thus blocking the chemical's direct access to the core.
- Apply a "safe" sealer before applying the finish. If using a very fast drying finish like lacquer, omit the sealer, but apply the first few coats **very** sparingly.

Avoid mechanically induced damage, such as holes, gouges, dents and tears, by practicing a simple rule of thumb: never remove the cores from their beds. Yes, that is an impossible rule, but just striving to obey it can keep your cores safe.

#### Finishing chemicals

Wood finishing chemicals come in a perplexing variety, although most fall into one of these categories: varnishes, lacquers, shellacs, latex paints, penetrating resins, stains, and waxes. In this article, I will refer to the first four, which are surface-covering materials, as "paints".<sup>2</sup>

Variations exist within the categories: urethane, polyurethane "spar" and synthetic varnishes are examples. To make matters worse, the ambivalent lexicography of the industry does not draw discrete boundaries between categories.

Each type of finish offers several important advantages and disadvantages, and it would take an entire book to catalog and compare them all. Lacking space for a task of that magnitude, I suggest a visit to the local library for those who need a complete treatise.

My preference is lacquer, although I

never paint the wood components of my planes. Lacquer is fast drying, requires no sanding between coats to achieve good coat-to-coat adhesion, and yields a reasonably durable, high gloss finish. Its major drawbacks are its hazardous and foam-philic natures and its susceptibility to marring from standing water and alcohol; imbibe neither in the presence of any lacquered item of value.

I do not recommend varnishes, which require at least 24 hours between coats, or latex paints, which lack durability. For the same reason, wax, used alone, is a poor choice.

#### Finishing methods

**No finish.** The primary advantage of this method, besides its being the easiest, is that it adds no weight to the plane. It suffers, however, from two disadvantages. First, it does not produce a high gloss wing surface, which means increased drag and, second, it leaves the wood sheeting unprotected from water damage, stains, dry rot and termites.

**Stain.** Next to "no finish" this method adds the least weight to the plane. However, it suffers some of the same disadvantages: it does not protect as well as paint or plastic, nor does it produce a high gloss finish. As with any chemical, there is also a safety risk, no matter how minor.

**Penetrating Resins.** These require little skill and produce a very durable surface. However, they are available in "clear" only and, since they soak into the wood, cannot produce a high gloss finish.

**Paint.** (Both opaque and clear). This method can yield an ultra smooth finish, but it's also hazardous, requires a high degree of skill and patience, is labor intensive, and yields a finish that's not easily repaired.

**Plastic Film.** There are good reasons why most builders prefer this method. It produces a high gloss, easily repaired finish in a single step operation. Also, it's

safe, since it involves no toxic or flammable chemicals. On the downside: it adds weight—though probably no more than a high gloss paint finish; it's not as decoratively flexible as paint; and it requires skill to achieve professional looking results.

One final point: transparent finishes produced by **any** method are very unforgiving of the slightest flaw in preparation. For a transparent finish to look good, the wood sheeting must be impeccable, with no filled-in dings, blemishes, etc.

#### Sanding techniques and ruining airfoils

As any carpenter will advise, the best finish is achieved long before the need for sandpaper arises. Careful selection of materials and precise assembly are the keys, particularly with airfoils where shape differences of only thousandths of an inch can measurably alter performance characteristics.

Sandpaper ruins an airfoil's shape. Sandpaper also smoothes an airfoil's surface... within limits. It's a dilemma: choose between smooth and ruined or rough and accurate. Or, as most do, smooth a little and ruin a little.

Once the airfoil is sheeted and edged, assuming careful, precise construction from the start, the only task that should remain is to smooth the wood's natural roughness. This requires light, even sanding only. There's no art or magic to this task, just care and patience. Use a flexible sanding block made from something like half-inch thick felt. Start with nothing coarser than 320 grit (Silicon Carbide), and switch quickly to 400, then 600 grit. Always sand with the grain, not across the grain. Don't over-sand.

Be aware also that sanding cannot reduce a wood's grainy texture. Eliminating the grain requires a filler, which could be the first several coats of a sealer or paint, or a filler proper (for example, thinned, light weight spackle). Plastic films also hide wood grain to some extent.

If you choose to paint, remember to apply many light coats and sand **lightly** between coats, unless using lacquer. Sand the final coat<sup>4</sup> with **wet** 600, or higher, grit sandpaper and then wax the wing (automotive wax or furniture wax) to bring up the gloss.

**Summary and recommendations**  
Exercise care and forethought, and the risk of damaged wings becomes insignificant. Construct the wings carefully, thus minimizing the need for sanding, which invariably alters airfoil shapes. Stick with plastic covering films—particularly if you're a novice flyer. They produce good, durable results safer and faster than chemicals. They are also easier to repair.

If you insist on a chemical finish, lacquer is the best all around choice for an ultra smooth finish, easily and quickly achieved. It is also available in spray cans

in a wide variety of colors from many auto stores. Remember though that it is hazardous and it melts foam.

<sup>1</sup> "The Soaring Site," *RCSD*, Vol. 11, No. 3, (March 1994), pp.2.

<sup>2</sup> The category "varnishes" includes "enamels", which are simply pigmented varnishes.

<sup>3</sup> Sanding between coats knocks off dust motes and improves the next coat's adhesion. Lacquer requires no sanding between coats because each subsequent coat softens its predecessor, thus achieving proper adhesion without human assistance.

<sup>4</sup> Alternatively, polish the wing using a damp cloth and automotive rubbing compound, or a slurry mixture of Rottenstone and either water or mineral oil. ■

### A Simple Calculator for Feather/Cut Taper Ratios

...by Cameron Ninham  
Bloemfontein, South Africa

Recently, I purchased a Feather/Cut foam cutting machine from Tekoa: The Centre of Design. It is a great aid for cutting foam cores, superbly crafted and well packaged! When cutting a foam core one has to attach the Pull Cords a pre-determined distance away from each side of the foam core to allow the Pull Cords to run free and clear of any objects, eg the template and holding pins. This will result in a change of distance that the hot wire will travel at the new *imaginary* Root and Tip. One can calculate the New Root and Tip lengths by drawing parallel lines to the Original Root and Tip a pre-determined distance (spacing) away from the Original Root and Tip, then extending the leading and trailing edge lines to intersect these parallel lines, and then measure the New Root and Tip lengths. The New Root and Tip lengths in turn

will determine the actual Taper Ratio Percentage - the setting used on the Feather/Cut machine. Tekoa suggests that you draw the panel to actual size, using either a CAD program or else draft the panel to actual size on paper, and then use this drawing to calculate the Taper Ratio Percentage.

I found it frustrating to calculate the taper ratio percentages of wing panels as suggested in their manual. It is time consuming, a waste of paper and/or time, often inaccurate or I easily make errors in drafting & measuring. With this in mind I designed a small computer program (for use on my programmable SHARP PC-1401 calculator) to calculate these taper ratios automatically. It works fine and best of all is that you can compute numerous panel's taper ratios in a couple of seconds.

My simple program to calculate the Taper Ratio Percentage can be easily adapted to suit your calculator or computer and needs. ■

### The Pascal Version:

Program fc; (\* fc.pas - FeatherCut \*)

```
Uses
  Crt;

Var
  l, r, t, s, r1, r2 : real;

Begin
  ClrScr;
  Write('Panel Length : ');
  Readln(l);
  Write('Panel Root : ');
  Readln(r);
  Write('Panel Tip : ');
  Readln(t);
  Write('Spacing : ');
  Readln(s);
  r1 := ((r - t) / l) * s;
  r2 := ((t - r1) / (r + r1)) * 100;
  Writeln('Taper Ratio = ', r2:5:1)
End.
```

### The Basic Version:

```
100 REM: A Calculator for Feather/Cut
101 REM: Taper Ratios
110 CLEAR : CLS
120 INPUT "Panel Length : "; l
130 INPUT "Panel Root : "; r
140 INPUT "Panel Tip : "; t
150 INPUT "Spacing : "; s
160 r1 = ((r - t) / l) * s
170 r2 = ((t - r1) / (r + r1)) * 100
180 PRINT "Taper Ratio = ";
      USING "###.#"; r2
200 END
```

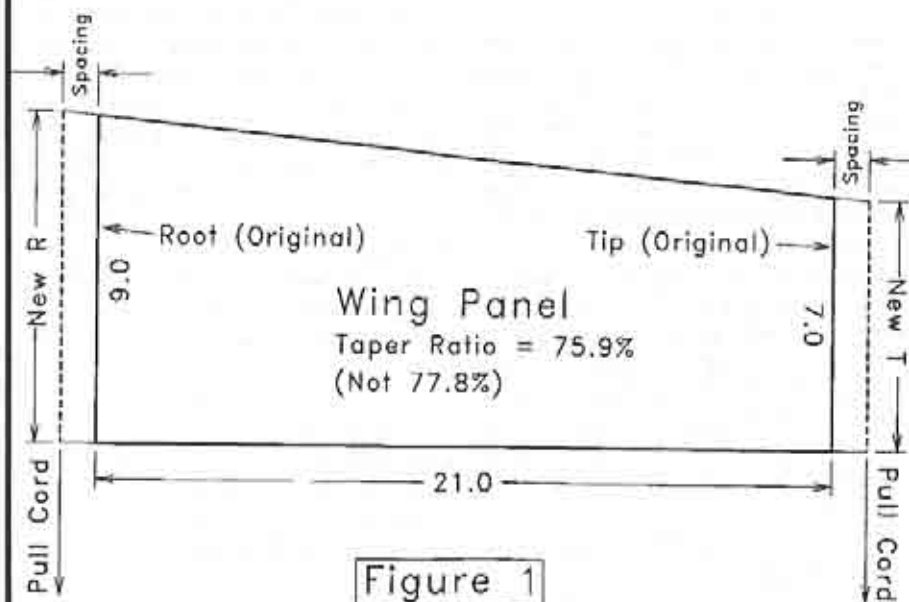


Figure 1





*Note the bagged-in color scheme on top of Genie #3. The bottom is black with the same markings in white and red. I don't know if anyone else has tried the paint trim techniques used here, but it is not difficult and results in a ridgeless transition between colors and no pin holes.*

## About the 140" GENIE Sailplane

...by Designer, Harley Michaelis, LSF023 Walla Walla, WA

GENIE is a project for builders into vacuum bagging who seek a sophisticated, composite wing, ultra-high performance ship at nominal cost. It has a flat center near 6' long and 1123 sq. in. wing area. A/R is 17.5 to 1. Detachable tip sections are supported & lock on with spring steel blades. Other than the wing, it is built like the JOUSTER (July '93 MA). Fuselage has the same profile, but is 6" longer behind the wing. Kevlar & glass cloth are bagged directly to the core. A spruce spar is inlaid in the top surface of the center. Using the center-clustered servos, the all-internal Direct Aileron Drivers and the all-internal flap mechanics, the wing is totally clean. All-up weight is 74 - 78 oz. for 9.5 - 10 oz. wing loading.

Besides giving practical landing advantages and flap servo gear protection, the fuselage profile helps merge and smooth airflow over fuselage and wing. Mike Selig employs this in his new standard class OPUS design. GENIE's absence of external clutter and gapless hingelines help make a very clean and quiet ship.

Size and overall appearance make it very eye-catching and easily distinguished.

GENIE is equally capable as commercial offerings selling for \$1000 or more, but requires only about \$150 in materials, plus cores. Scratch building without concern for profit, you can take the time to control quality and get a finished appearance better than seen on some of the higher end ARFs on the market. Painting, including trim colors as the pics show, is done on the waxed mylar. During bagging, this transfers to the wing surfaces, leaving no pin holes or ridges between colors. Text fully details mylar and cloth sizing, layup and painting technique.

Although L/D, sink rate, etc., can't be objectively measured in real flight and quantified, in flight we get impressions about how a ship performs, and performs relative to others we have flown or seen flown. My flying buddies and I get most favorable impressions and share the opinion that superlatives given other ships in the press, etc., apply equally well to the GENIE. However, let's look at performance and handling on a practical basis that we can all understand and relate to.

On the tow, you can stand on the pedal... and go! Ascent is steep, straight, and fast. In the zoom, momentum and cleanliness materially increase altitude or distance even without TE reflex. A heavier duty high start gives super launches, too. IMPRESSION: Although lightweight, the composite construction generates a wing strong enough for gorilla launches.

In cruising, the ship covers a lot of ground with much less-than-expected altitude loss. IMPRESSION: You can seek longer and farther out without getting into a panic situation.

As to maneuverability, this is no big slug! Tip sections (bagged, painted, hinged, DADS and spring steel blades installed) come in at 7 oz. With servos center-clustered to cut outboard mass, the roll rate with ailerons and coupled rudder is crisp, as is pitch response. A 2nd flap servo so flaps can act as ailerons is overkill, waste, unnecessary weight, and needlessly dirties up the wing with external hardware. IMPRESSION: This thing is agile and quickly responds to go where you want it to, with a relatively simple 5 servo installation.

Tracking, due to the liberal vertical tail and moment arm (.020 VTVC) is particularly steady. A rigid stab mount and well-defined stab neutral avoid constant pitch correction. IMPRESSION: "Groovy" in roll and pitch. Nicely handles inverted, too.

Thermal indication is clear and immediate. The long and liberal A/R wing, with its light tips, quickly reacts. The tail promptly raises to help confirm its presence. It is common to see the GENIE enter lift under other ships and systematically rise above them. IMPRESSION: In lift this baby responds and hangs in there when many ships are dropping.

In landing, if airspeed is up even a little, GENIE covers a lot of ground at low altitude. Flaps are essential to avoid an excessively long landing approach and

there is near 6' of them to slow the ship. IMPRESSION: Easily slowed down... Easily controlled for precision work... Responds well to control input at very low speeds. Touchdown can be docile and gentle or you can grind in the built-in shark's teeth. Crow adds to sink rate when needed.

On occasion, while in lift, I like to apply some down stick pressure, build speed and really cover sky. Even without reflex, speed rapidly builds to a point where I feel the hairs raising on my neck. I chicken out at what I think is 70 mph or so, although there is no indication of flutter. IMPRESSION: Speed is there when needed and the airframe, properly built, can handle it.

OVERALL IMPRESSION: Clean, quiet, fast, solid, responsive, nimble, thermal-sensitive, wide-ranging, easy to handle, no bad habits, distinctive appearance. Pure joy to fly and watch.

Adjectives are easy to toss about, but I feel the above appraisal is fair and representative of the capabilities. Properly built and trimmed, this should be the expected performance.

On the premise that bigger is better, GENIE's size is partly responsible for its capabilities in flight. However, although larger than more common ships around, it is sleek, slim, and does not seem large or bulky. In this regard, an important feature is a small cross section just behind the wing for firm grip for high tension launches.

GENIE is built using JOUSTER plans (#739 - \$14.75) and a \$10 PP pak from me that includes a polyester resin/fiberglass canopy, blades, materials list and thorough supplementary text. Pages include pertinent computer-generated graphics, including core layout. Custom cores (SD 7032) are available from Harry Smith for \$50 PP. A custom-made, pressure sensitive, vinyl logo that has "GENIE" in black script, emerging from the spout of a

golden "Aladdin's" lamp is \$2 with the above package or \$2.50 separately. Note this logo at the wing center.

If ordering same time, put payment for Harry in same envelope as mine to save a stamp. If I know that you are ordering

cores, my package will be in that box to best protect it.

Harry Smith, 814 Home, Walla Walla, WA 99362; (509) 525-1554

Harley Michaelis, 26 S. Roosevelt, Walla Walla, WA 99362; (509) 529-2562 ■



## Another Computer Simulation for the Winch Launch of the RC Sailplane

...by John Hazel  
1009 Westmoreland  
Kalamazoo, MI 49006-5567  
(616) 342-8122

© Copyright 1994 by John Hazel

This article is a supplement and continuation of "Creating a Computer Simulation of the Winch Launch for RC Sailplanes" which appeared in the January 1994 issue of RCSD. Several people have requested that the 3-D data be replaced with simple line graphs. Others have requested an estimate of "bottom line"

results that tell them just how much difference in the launch can be expected. The response is given here.

Consider the forces acting during a winch launch. They are the lift of the sailplane, drag of the sailplane, tension of the towline, drag of the towline, and weight. These forces tend to balance each other soon after the release. Line tension is the energy source for this situation. Greater tension causes higher speed which creates more lift and drag. Weight however does not change with increased tension. Comparing two situations: one where tension is low and the other where tension is high. Weight is relatively large compared to the other forces in a low tension launch and relatively small in a high tension launch.

Launch Height vs. Line Tension

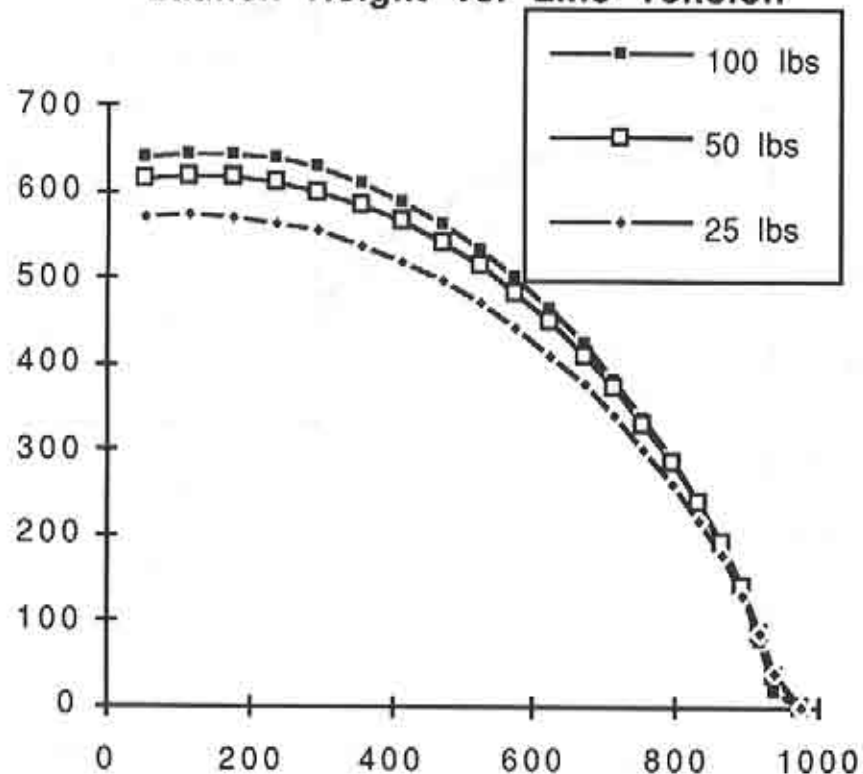


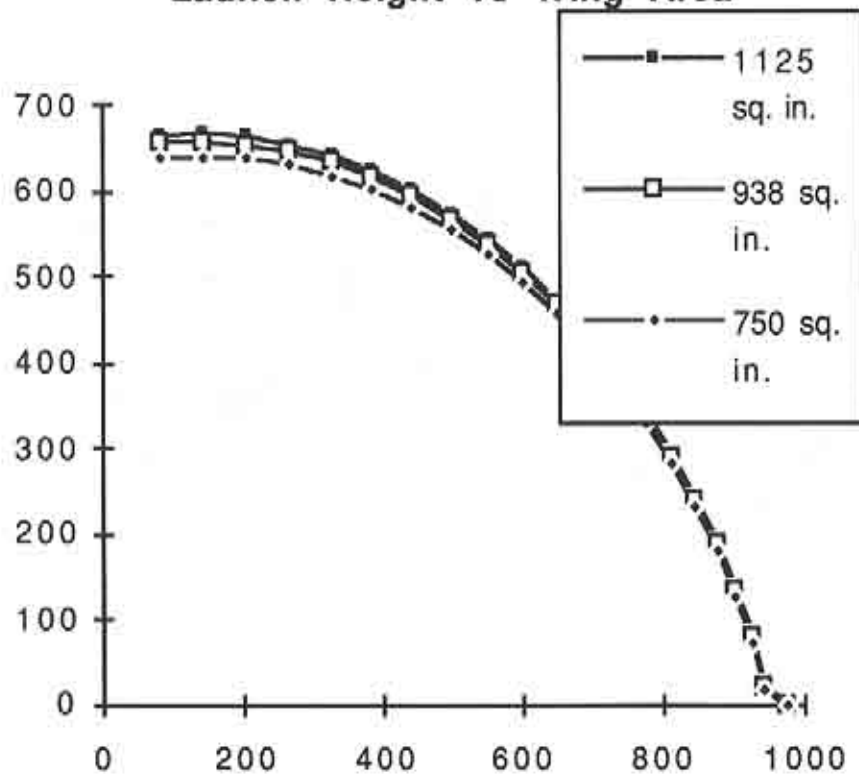
Figure 1.

With the smaller percentage of lift being used to overcome weight a high tension launch should give greater altitude at the end of the tow. Figure #1 gives the result of varying tension. The graph is the actual flight path taken by cyber-soarer through cyber-space driven by cyber-winch when cyber-man goes light, medium and hard on the cyber-foot-switch. Two notable results appear in this graph. The first is that going from a light to a heavy foot is likely to result in more than fifty feet of extra height. The second is that doubling low tension to get medium tension is going to give more improvement than doubling medium tension to get high tension.

Notice in figures #2 and #3 that increasing wing area or wing span increases

launch height. This will come as no surprise to anyone but it does give us an idea of what can be gained by increasing area or wing span. These graphs indicate that a balance must be struck between launch and glide performance. A low aspect ratio wing gives slightly inferior glide but launches better and is easier to see than a high aspect ratio wing of the same span. This trade off is perfectly illustrated by two nationals winners. Brian Agnew is the designer of the Banshee, and Troy Lawicki created the Duck. Mr. Agnew flies at minimum sink most of the time and is known for being able to catch gopher belches until he gets his max. Mr. Lawicki by contrast launches hard and heads for the horizon in search of that hat-sucking thermal that he cruises in

**Launch Height vs Wing Area**



**Figure 2.**

until he can fly home inverted from. The Banshee has a relatively high aspect ratio and uses a low sink, sweet mannered, E387 airfoil while the Duck 2m has 758 in<sup>2</sup> wing area and a more aggressive S3021. Who can decide which is the better design?

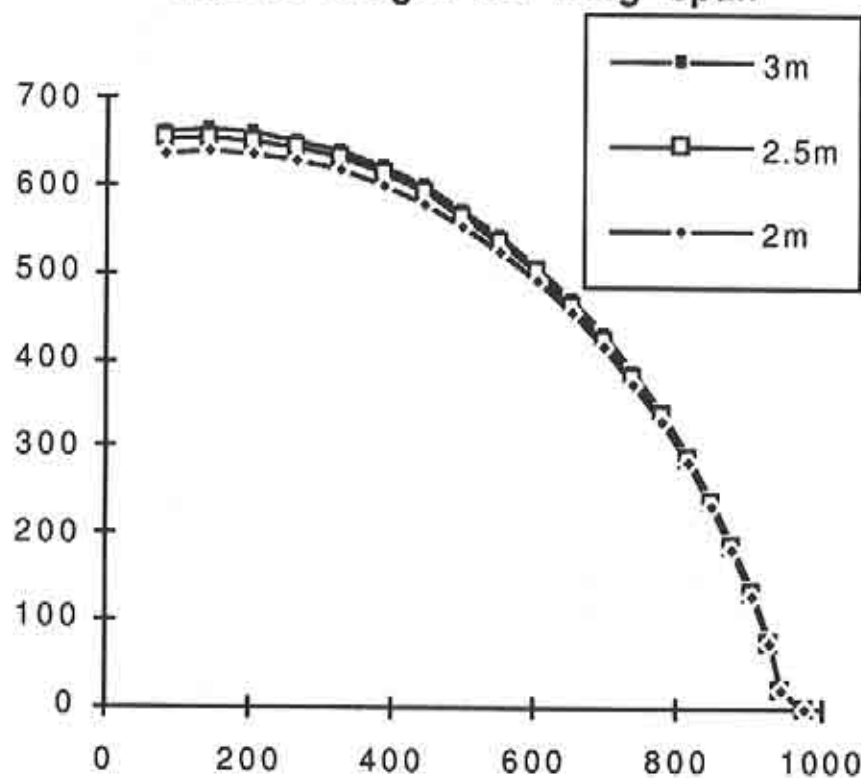
Who would dare? One thing is certain though. These two planes are well matched for the flying style of each pilot. Hmmm....

Another consideration for designers is the coefficient of lift during the launch. Figure #4 shows how high and low lift wings compare with regard to launch height. Diminishing returns are here to see again however they are not as severe as in the varying line tension case. In this case, the tension is constant for all three

CI's. The consequence is that the high CI goes up more slowly while providing the same lift as the lower CI examples. This reduces the drag of the towline and results in higher launches. Experiments along this line have indicated that most people could get higher launches if they would drop their full span flaps a little farther for the launch.

Warning: Consider the wind. The graphs shown here assume that there is no wind so this information is only applicable to windless launches. There are huge differences in the results when the wind blows. The actual graphs of these results will appear in a later article, but to sum up the effects of wind, a low tension launch of a large wing area sailplane which progresses to a high tension launch

**Launch Height vs. Wing Span**



**Figure 3.**



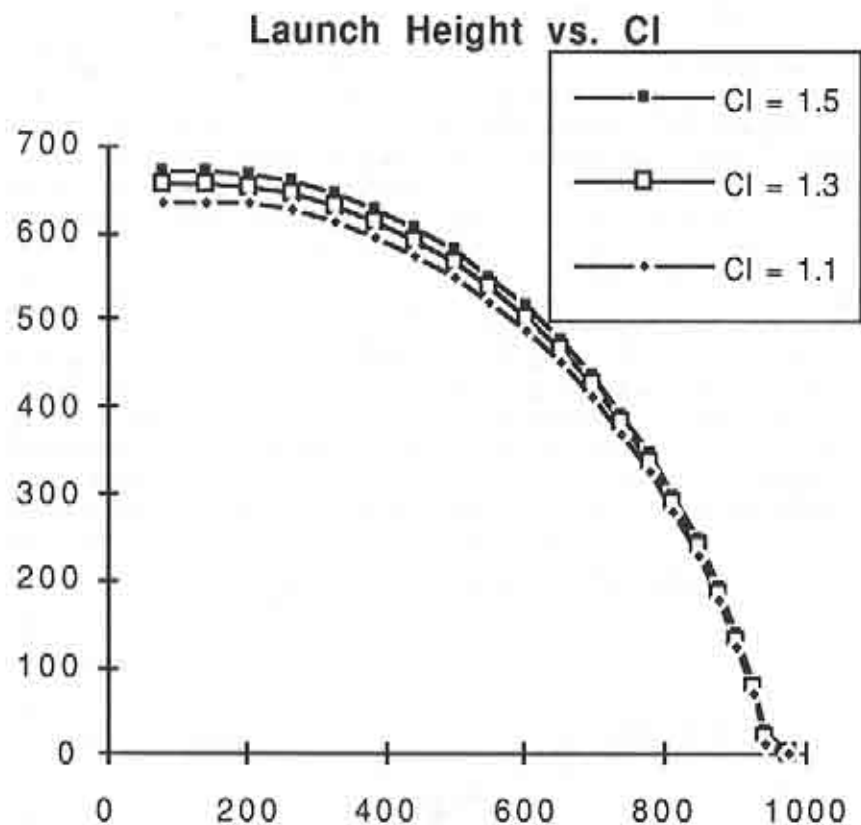
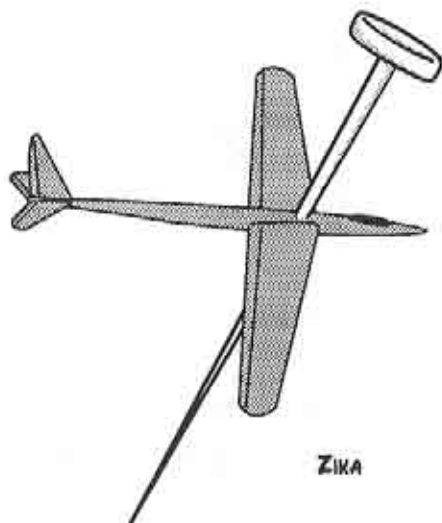


Figure 4.

near the top will give best launches. In the case of downwind launches higher tension is always better.

Finally, the most recent version of this simulation has the following additional variable parameters: line elasticity and hysteresis, winch speed and torque characteristics, pretension and throw, zoom Cl, Cd and duration, pull-up Cl, Cd and duration, final climb Cl, Cd, and duration. As a teaser, there may be pockets of high performance for limited winch power situations such as F3B. More in a later article. ■



Mark I uses Windfree wings, too-small canard and short-coupled rudder. I even tried a front rudder to get better turning.

### My "Hodge-Podge" Canard

...by George C. Siposs  
Costa Mesa, California

My fellow club members know me as one who prefers built-up polyhedral planes and one who also likes to experiment with odd designs. I am a romantic and proud of it.

To me the eternal fascination in modeling is constructing something out of sticks of wood and watching it fly. Hi-tech, (read: high cost) models are a superb technical achievement but, they don't define a relaxing activity to me. I've gotten the competitive urge out of my system years ago. (I also remember the fun I used to have with slot cars, building every part to be realistic, until the hi-tech expensive "thingies" took over and spoiled the hobby.) For these reasons I try to keep a healthy perspective and keep modeling a true hobby: low cost, relaxing, to satisfy the creative urge.

Creating new designs challenge me. I had accumulated the healthy parts of some not-so-healthy models with the idea that some day they may be useful for an unusual project. I hate to throw away a perfectly good wingtip just because the center had broken. Or a good fin-rudder or wing... the fuselage of which had broken. So when I looked into my trash bin and found some parts which were still

serviceable, I wanted to combine them into a new configuration. Why not a canard glider?

The Wright brothers thought highly of canard designs and so did Burt Rutan (designer of Voyager and the E-Z series). By the way there is some controversy about the word "canard". Some people translated it from the French into German as "ente" and Hungarian as "kacska", both of which mean "duck".

Here and there I had seen an ad for canard gliders but have never seen one flying. A canard design offers several advantages:

1. The "tail" is also a flying surface, hence adds to lift (albeit also to drag).
2. Because the canard stalls first, the plane does not stall; it mushes when the canard stalls. Thus, it offers a relaxing model to fly and a good one for teaching novices.
3. The plane has an unusual and distinctive appearance, hence it is easy to recognize when several models circle in the same thermal. Unfortunately, nobody could help me with theoretical solutions to finding the C.G. "Trial and error," they all said.

If you have some crashed models that have a few useful flying surfaces, and if you like to experiment, this project may be for you.

For Mark I, the first trial, I had a pair of old-but-good Windfree wings and decided to use them for a hodge-podge canard model. I cut off the outboard panels of a polyhedral wing from a 2-meter Pierce Aero to make the canard surfaces, and used the fin of a Libelle (an old Japanese kit). To tie them together, I used some balsa sheets to make a simple slab-sided fuselage that has a square-U cross section (open at the top). It was to be a simple design with the canard being actuated by a bellcrank, similar to what you would use in a stabilator (flying tail). Because the fuselage is open at the top (until the final covering), the radio installation was extremely simple and straightforward. The only trick was to arrange the wing incidences and to find the center of gravity.

As it turned out that was more difficult than the rest of the project because I did not have formulas or plans to go by. I had to go through considerable experimentation, crashes, rebuilds and modifications until the final design evolved successfully. Rather than giving you hard numbers, I'll relate some ratios and guidelines that will enable you to design your own model, using components of your crashed gliders. You can scale the plans up or down, using polyhedral or dihedral wings.

Starting from the front, I proportioned the canard surface to be one third of the main wing area. My canard (the up-front stabilizer) has a slight dihedral for additional stability. Being the wingtips of a conventional model, each panel is slightly tapered and has a Clark-Y airfoil. Two small brass tubes are epoxied in to accommodate the steel wires coming from the bellcrank which is actuated by a conventional pushrod. Like a flying stab.

The nose block of the fuselage is a piece of balsa. The fuselage is basically an open trough with sides that are 1/8" thick, the bottom is 1/4", with the grain running lengthwise of course. Every few



*Mark II used larger (1/3 wing area) canard, longer fuselage for better rudder action.*

inches a crosspiece keeps the sides from caving in when you grab the fuselage. Also, it is a good idea to cement in some plywood doublers in the stressed areas (e.g. where the wing wires are epoxied in). This keeps the balsa sheets from splitting. Don't hesitate to make the front of the fuselage strong; this adds useful weight rather than having to use lead in the nose.

The wing should have conventional dihedral or polyhedral. The wing wires come out of the sides of the fuse, or the wing can be top-mounted with rubber bands. On Mark II the fin had to be located a fair distance behind the wing to give it a tail moment, because it lacked turning authority.

Mount the R/C components close to the canard to serve as nose weight. A simple radio will suffice, one servo for canard-elevator and one servo for rudder. Finish the plane before installing the radio, leaving the top of the fuselage uncovered. Shift the battery and servo locations until the plane seems to balance properly, then hard-mount the com-



*Wingtip mounted rudders, shortened fuselage.*



*The road to success is paved with many failures...*

ponents and cover the top of the fuse with Monocote. Use plastic pushrods with the sheaths supported every few inches by epoxied-in wood block cross members to prevent buckling.

The flying surfaces alignment (decalage) is critical. Most Clark-Y wings fly best at around 3 degrees of incidence so mount the wing at a 3 degree angle, relative to the longitudinal axis of the fuselage, which is the reference line. (This presents the smallest cross section of fu-

selage to the flight path.) The canard is a lifting, load bearing surface so it "flies" at a 3 degree angle relative to the wing (i.e., 6 degrees relative to the fuse). Remember, when the canard is parallel to the fuselage it is already 3 degrees "down-elevator"!

The elevator action rotation should allow for +/- 5 degrees up and down for proper control. Too much down elevator may result in a tuck-under.

Because the canard supports part of the weight and because it has an area about 33% of the wing area, the center of gravity is located as follows: locate the mean aerodynamic lift point of the wing (about 33% from the leading edge) and the same for the canard (also 33% from its L.E.) Mark these locations on the fuselage. Divide the distance into three parts. The C.G. is close to the one-third point ahead of the wing, good enough for a first trial flight. In my case, the wing and canard share the load proportionally to their areas. Their lifting points are 25.5 inches apart so the C.G. is 8.5 inches ahead of the wing's center of lift. A slight sweepback is good for stability. Adjust CG by flight tests about 1/4" at a time. Tape a one-ounce lead weight on top of the fuselage and keep moving it as required until you reach an optimum (determined by flight tests), then you can fasten the lead inside the fuselage, or remove the radio components. (It is easy to rip off the Monocote from the top of the fuselage and then redo it. Only my battery switch and charging plug are exposed for easy access, everything else is covered, there is no canopy or hatch.) When the alignments and CG are arranged optimally, your glider will suddenly fly as well as any of your conventional gliders.

The tow hook is mounted at or just ahead of the CG. Epoxy a block of wood to the inside of the fuselage (make sure it is fastened to the slab sides otherwise it may rip out the bottom on a hard launch)

and screw an L-shaped picture hook into it.

The plane soars majestically, is very easy to fly and creates a lot of comments. It is easy to spot against the sky as it seems to fly "backwards". Landing it is easy because it can be "mushed in" for a spot landing even without the use of flaps or spoilers. All in all, it is easy and worthwhile to put together a hodge-podge canard because it does not have to be exact. If you want a relaxing project, this is it. Mark I proved my point but I

wanted to improve on it. Mark II had the same wing but a fuselage-mounted rudder which produced skidding turn because of lack of leverage. Mark III uses wingtip mounted rudders and the fuselage is shorter, requiring less balance weight, hence the flying weight is reduced. The wingtip rudders are very vulnerable during landings so I intend to experiment with Mark IV...

If you develop your own successful canard glider or have experience in this area, I'd like to hear from you. ■

## Servo Wiring

...by George Siposs  
Costa Mesa, California

If you have several radio sets of various manufacture and would like to switch servos among them you should know that they don't all get wired the same way in the factory.

Each servo has three wires: one for ground (or return or negative), one for battery power (this is called "hot" and supplies +4.8V), and the last one is for "signal" (i.e., the radio control input).

The three wires have three different colors and you must not assume that they match. Here is the color code for each system:

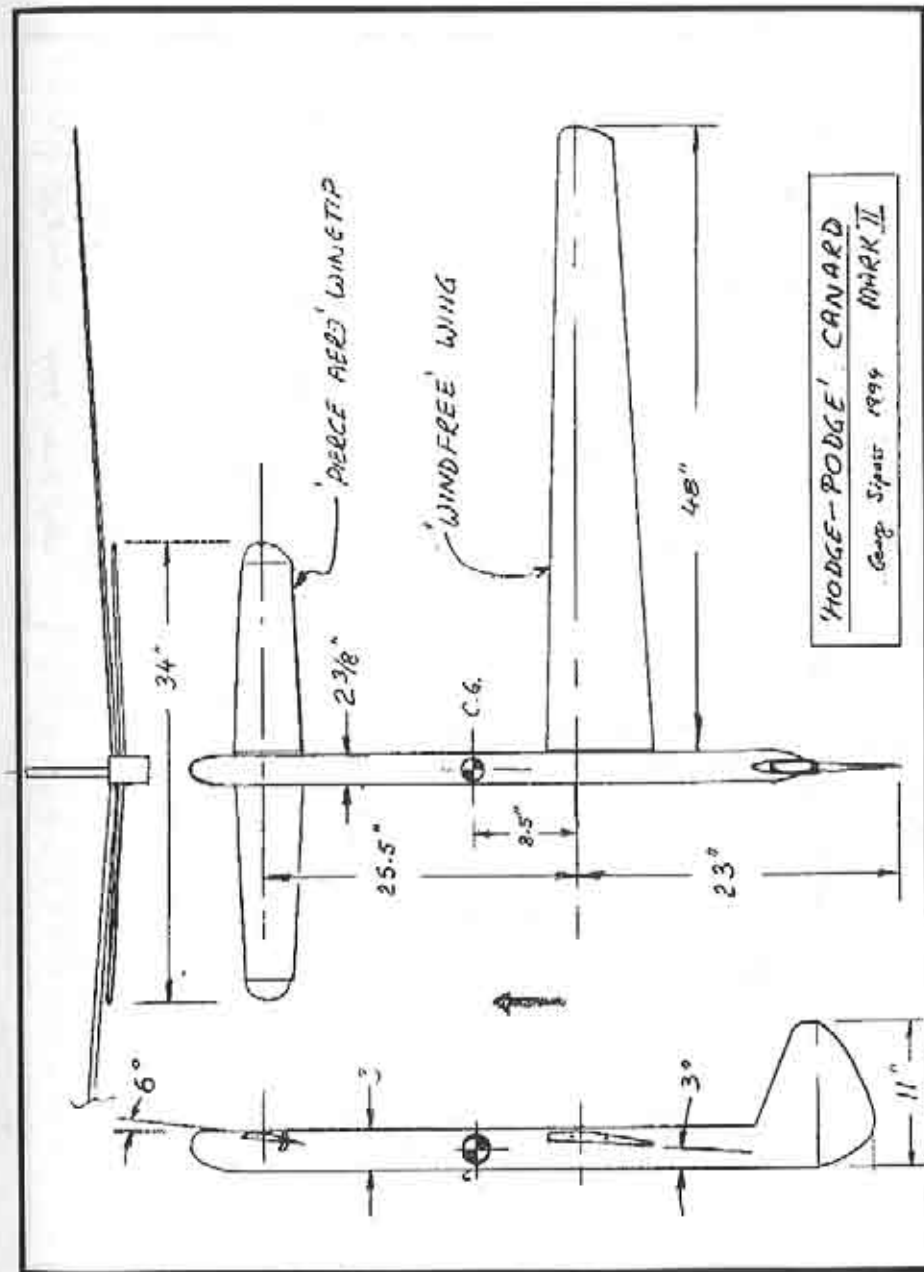
Color	Futaba "G"	Futaba "J"	"JR"	"AIRTRONICS"
RED	hot	hot	hot	hot
WHITE	signal	signal	—	—
BLACK	ground	ground	—	edge(#1)signal center = ground
BROWN	—	—	ground	—
ORANGE	—	—	signal	—

Note: On Hitec or World Engines radios: black = ground, yellow = signal, red = hot.

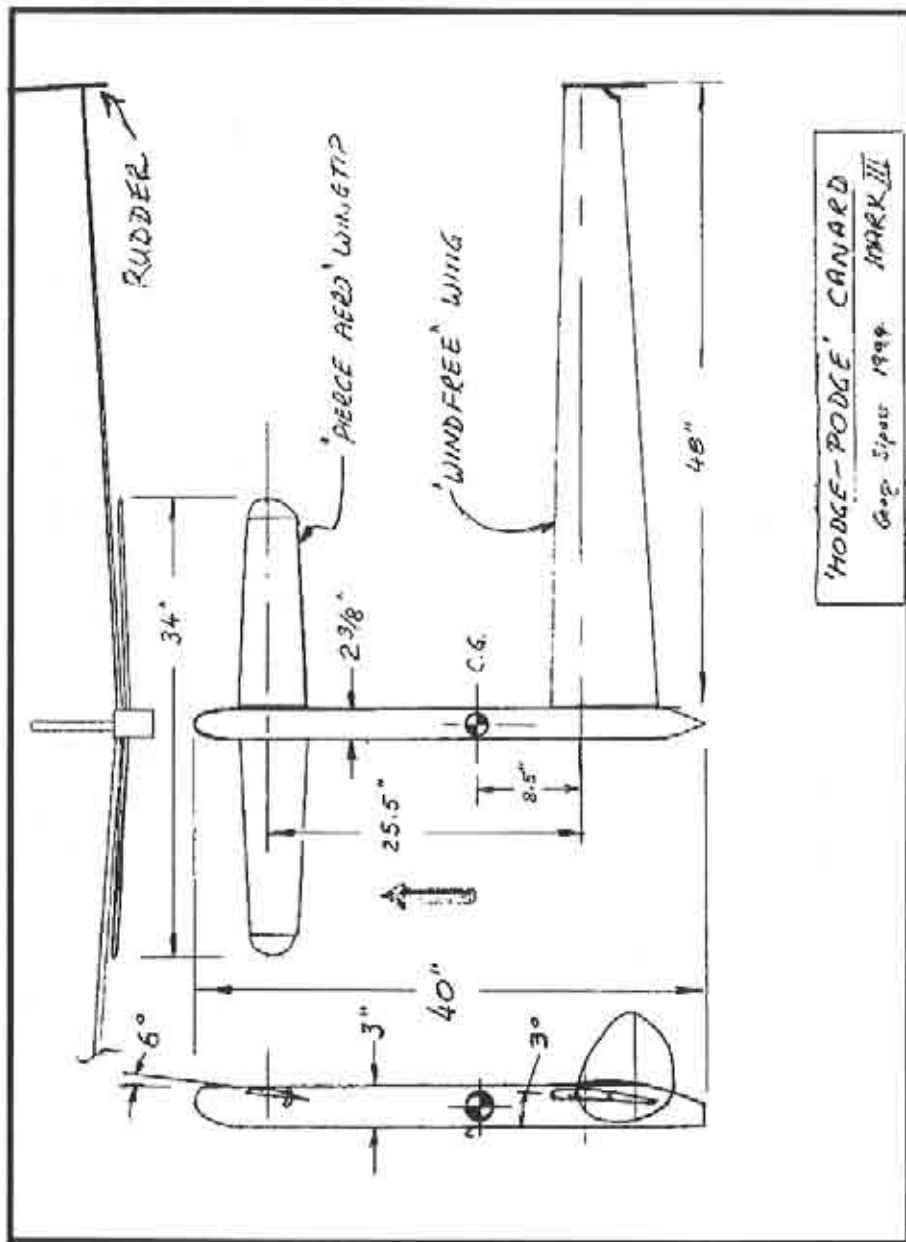
Charging: The transmitter charging plug on ACE, AIRTRONICS, Hitec and Futaba is hot = center, and ground = outside ring.

On "JR": the center = ground, and outside ring = hot!

NOTE: A universal servo connector is available. It is equipped with 4 pins and 3 wires. By removing the cap you can convert it to a male connector. The catalog number is "CEU" and it costs \$3 each. Order from: Custom Electronics, RR 1 Box 123B, Higginsville, MO 64037; Telephone 816-584-6284, Fax 816-584-6285. ■





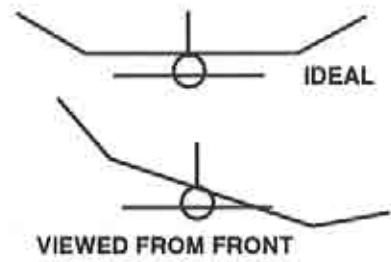


'HODGE-RODGE' CANARD  
 George Siposs 1994  
 MARK III

### Flying Hint

...by George Siposs  
 Costa Mesa, California

On older, often repaired models you may have noticed that the plane turns easier and more obediently to one side. In other words, it favors a left turn over the right or vice versa. If the wing is balanced (left and right halves weigh the same) and it is not twisted, the favored turn is caused usually by the stabilizer being twisted on the fuselage so that it does not appear symmetrical when viewed from the front. (The stab and wings should make the same angle relative to each other when you view the plane from the front.) In most cases you will find that the plane favors a turn so that the stab flies hori-



PLANE TENDS TO TURN BETTER TO ITS LEFT!

zontally while the wings are banked. Go with the flow and keep flying "favored" circles instead of forcing the plane to circle the opposite way which requires greater control deflections, hence more drag, hence more sink. Think about it. ■

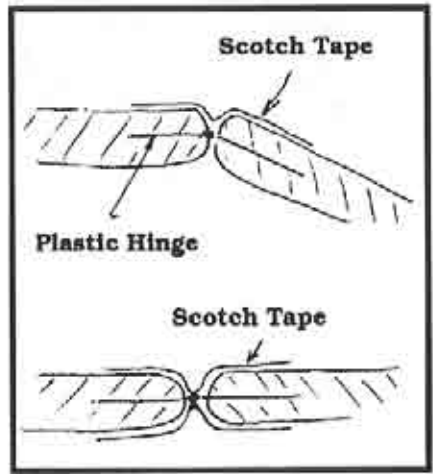
### Gapless Hinges

...by George G. Siposs  
 Costa Mesa, California

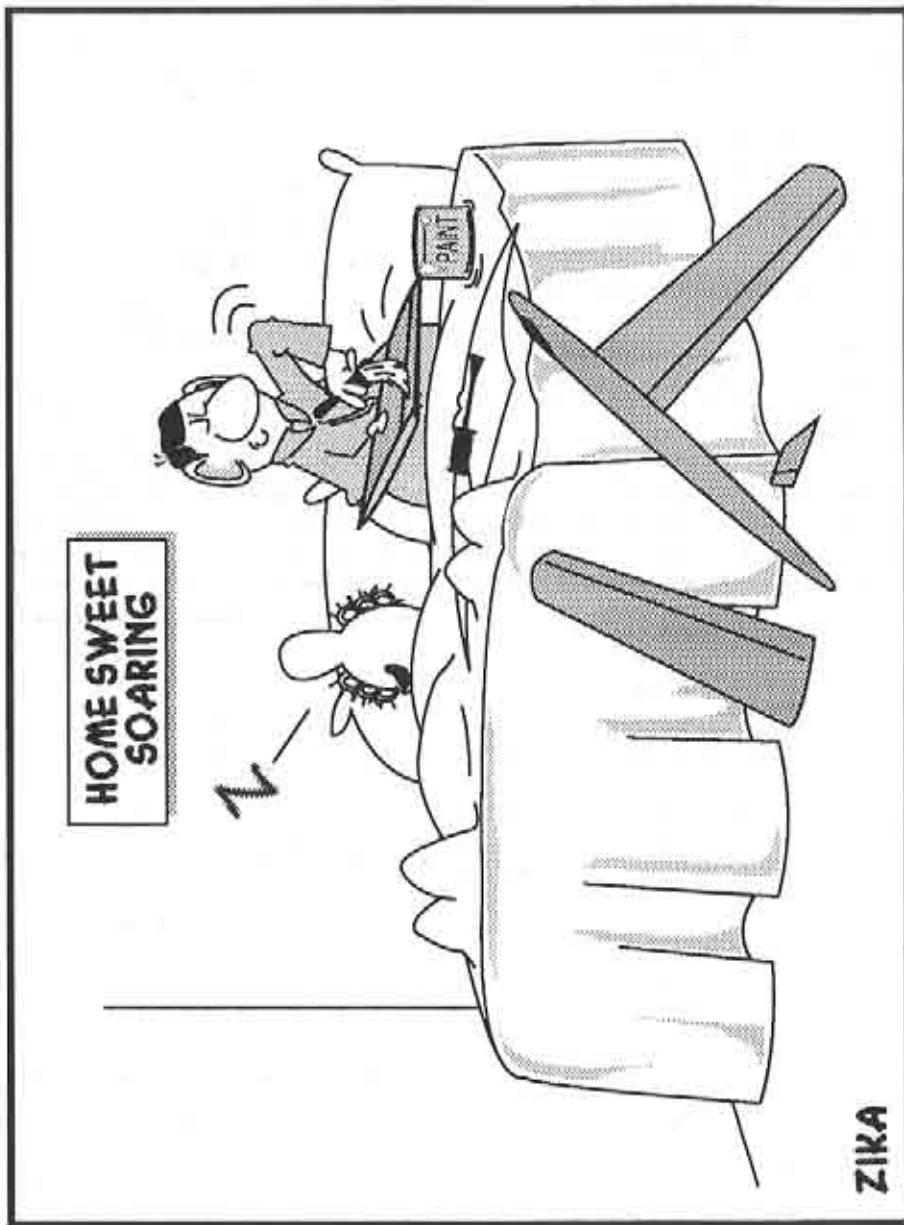
When you use plastic hinges, they usually leave air gaps between the controlled surface and the main surface (e.g. between elevator and the stabilizer). When the controlled surface is deflected, the concave side builds up pressure and the convex side develops suction. The imbalance of the pressures equalizes by air slipping through the gap. This reduces efficiency and creates turbulence.

Luckily there is a way to reduce airgaps by a simple technique.

1. Turn on the radio (Tx and Rx).
2. Deflect the surface as far as it will go.
3. Turn off the receiver. This freezes the surface in the extreme deflected position.
4. Apply a strip of Scotch tape along the gap on the convex side so that it is equally divided between the main and control surfaces.
5. Turn on the receiver and deflect the surface to its opposite extreme position.
6. Turn off the receiver to freeze the controlled surface.
7. Apply Scotch tape on the convex side. Press it into the air gap.
8. Turn on the receiver and, when the controlled surface returns to neutral, press the Scotch tape from each side into the gap. If the two tapes touch, so much the better.



Now you have a gapless hinge. ■



### A Letter to the Soaring Community April 1994

...from Bob & Tim Renaud  
Airtronics, Inc.  
11 Autry, Irvine, CA 92718  
(714) 830-8769, FAX (714) 380-4140

This is an open letter to the R/C soaring community to update Airtronics friends and customers on the status of our company as a whole and our kit line in particular. There have been some changes here at Airtronics over the past six months, and these changes have led to rumors and speculation which stray far from the actual truth. Several well intentioned articles which have appeared in club newsletters recently have only added to the confusion. Sending out this letter from the source should clear the air and dispel the rumors.

First of all, Airtronics is not being sold, and we are not on the verge of closing the doors. This is our 23rd year in the industry and we intend to continue doing business for a long time to come. Barbara Renaud did retire from the presidency of the company last year, following through on her desire to serve as president for ten years and then step down and direct her energies into other areas. Bob Renaud is the new president of Airtronics, taking over in April of last year. Bob's age and experience in the R/C industry ensure that a member of the Renaud family will continue to head up Airtronics for many years to come.

Airtronics has discontinued the production of all the machine cut balsa and plywood kits due to the extremely high cost of producing them. These kits include the Olympic II and Olympic 650, Sagitta 600 and 900, Eclipse Standard and Deluxe kits, the Whisper 2 Meter and Whisper 95, the Legend and the Q-Tee. Production was actually stopped in October of 1993, and at this point we have no stock of parts or completed kits left in our warehouse. There may still be

some kits available through retailers who received shipments as we sold the stock on hand when production ceased, but Airtronics has no information on which retailers might have product left. At this time we are looking into alternate methods of manufacturing which would allow the built up wood kits to be profitably reintroduced at a later date. One of the options being explored is laser cutting, and if a way can be found to deliver Airtronics quality at competitive prices we'll bring the kits back, but for now they are out of production.

Airtronics will continue to sell a line of composite kits featuring fiberglass fuselages and pre-skinned obechi covered foam wings. In October of 1993 we were forced to find a new manufacturing source for these planes, and it has taken six months to bring the new production on line. The lack of product availability has been taken by some to mean that Airtronics has dropped these kits as well, but that is not the case. Airtronics will still market the Flite Lite Composite kits and move forward with the development of new designs in this product line. The Falcon 800 and Falcon 880E are no longer in production, and there are no plans to bring them back. The Falcon 880 with the 3021 airfoil is scheduled to be phased out unless market demand is strong enough to merit additional production. The Thermal Eagle, Falcon 600 and Falcon 550E will all continue to be available. The Swift, Peregrine and Legend SC will all be introduced and available in June of this year.

We hope that this letter has answered any questions or concerns that you may have had. Please call us at (714) 830-8769, Extension 13 for Bob Renaud or Extension 15 for Tim Renaud and we will be glad to answer your questions or provide any assistance.

Sincerely, (signed)  
Bob Renaud, President  
Tim Renaud, Operations Manager ■

## 1994 CIAM Soaring Report

...by Terry Edmonds,  
Subcommittee Member  
4125 180th St. NE  
Solon, IA 52333

The CIAM Soaring Subcommittee conducts business for five FAI RC soaring classes. Two classes are official events, F3B and F3J, and three are provisional: F3F, F3H, and F3I. The 1994 CIAM meeting had rule proposals on the agenda for both official classes and none for the provisional classes.

### F3B

A proposal from Belgium to permit a competitor to use three models instead of two was presented. Mid air collisions and other accidents have on occasion unfairly handicapped a competitor. This can force a competitor to fly a hastily repaired model. The proposal was approved but will not be effective until 1997 because it is a change in model specifications. When the new rule does come into effect, a third model entry will have to be processed at the same time the first two models are processed.

Another Belgium proposal to prohibit charging of the winch battery in the launch area was brought about by a team doing this at the 1993 World Championships. A new rule was approved to ban charging of winch batteries in any of the safety areas. This rule is considered to be a clarification and is in effect immediately.

A third Belgium proposal to require at least three timekeepers and at least two officials at both Base A and Base B in the speed task did not obtain approval. Considerable discussion of the merits of the proposal versus the added burden to contest organizers took place in the technical meeting. Because FAI rules cover World Championships, the proposal did get a majority vote in the technical meeting. However in the plenary meeting, opposition was presented that the pro-

posal was not clear as to how the base officials would function, resulting in the proposal being defeated. I suspect this proposal will surface again in the future worded differently.

A bid for the 1995 F3B World Championships was offered by Romania and accepted. Details of the championships were not available but were promised to be submitted by the Romanian Delegate.

### F3J

A subcommittee proposal to prohibit the use of mechanical aids (pulleys) in hand towing was referred back to the subcommittee for further study. This is an important issue to F3J as its final decision will determine the direction the class will take. It has been demonstrated that by using pulleys and or multiple tow persons, which the rules currently allow, that very high tow tensions can be created, possibly greater than a winch. This does allow a heavy model to be easily towed in a no wind condition. On the other side of the issue is that this is a strong departure from the original concept of F3J to have a simple low cost class for thermal duration RC gliders. There is a safety issue to the pulleys, as well. It is common practice when using the pulley(s) to stake one end of the tow line, and pull away from it. If the stake comes out of the ground, it will likely fling towards the tow person. One individual has already been injured in this way.

It was expected that F3J would obtain World Championship status at this plenary meeting because all of the requirements have been met. Unfortunately, that did not happen due to a technicality of the item not being on the agenda. There is a resistance within the CIAM to the "proliferation" of World Championship classes, especially those that are similar. Fueling the fire is that F3J is taking a turn for a recycled F3B event with high power launches and F3B type models. I invite your comments on this item. ■

### Paris Was Great!

...by Jack Sile  
Vice Chairman F3J (FAI CIAM)  
21 Bures Close  
Stowmarket, Suffolk  
England IP14 2PL

Well, Paris was great! A real learning experience. As far as F3J goes, the subcommittee decided that any championship would be opposite F3B (i.e., F3B in Romania, and F3J in 1996). BUT, there are problems; F3J has to be first accepted as a world class event, and could have a hard road to World Championship status.

I could not find any delegate that was interested in aerotowing. Just not enough interest at the moment.

Now, what I did recognize is that if you can't say what you have to say in two concise sentences, you have lost! The plenary meeting is extremely professional and delegates have got to get their point across in one good go or forget it. I equate it to an executive meeting at IBM! If the letter of the law (the Sporting Code) is not followed in making the proposal, then one has to wait until the next time. Nic Wright and myself hope that next year or when required, that we can put our own cases forward when the need occurs for soaring to speak. I have until the CIAM Bureau meeting in December to do some lobbying. ■

### Thermo Flügel DG-600

...by Jerry Castillo  
Chino Hills, California

I recently purchased a DG-600 by Thermo Flügel from Mark Foster of Pasadena, California. The kit was manufactured so well that I thought I would write to share the excellent points of this fabulous kit so that others will know where to acquire one.

The DG-600 has a wing span of 3800mm and wing tip extensions to increase it to 4400mm. The wings and tail surfaces come pre-sheated and include the spoilers. Probably the most impressive aspect of the kit is the fuselage. The fuselage is made of fiberglass with a beautiful white Gel coat finish. There are no seams on the fuselage which makes for very aesthetically pleasing lines. The canopy is clear and comes pre-cut. Add a full body pilot and the cockpit area becomes a real scale center piece of this model. All hardware and decals are included with this kit. The kit goes together very easily and should not present a problem to the average modeler. Anyone interested in purchasing a Thermo Flügel model, other scale designs are available, should contact Mark Foster at (213) 257-4573, 826 Oneonta Dr., Pasadena, CA 91030. ■



ZIKA



## 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*.

### Jouster Hand Launch

...from Sky Bench Aerotech

The Jouster R/C hand launch sailplane is a hand launch version of Harley Michaelis' famous class D sailplane, and is designed for hand launch, mini hi-start, or slope flying. True to Harley's design, the 1.5 version has wash out to improve handling characteristics, plus the Christensen wing tip. Mini or micro radio equipment is recommended, but a 270 mah flight battery and larger equipment can be installed in most cases.

The kit contains construction plans (You may want to scratch build a wing and use the bottom foam bed to keep the under cambered ribs aligned.), instructions, machine cut parts, wing attachment bolts, control cables, aluminum stab joiner tubes and wires.

The specifications are: 1.5m wing span, 360sq.in. wing area, 12 oz. flying weight, 4.8 wing loading, SD7032 airfoil, and a full flying stab. The construction is: foam wing sheeted with contest grade 1/32 balsa wood, 3/32 balsa fuse sides laminated to 1/64 ply wood from nose to tail, built up diamond shaped stab. Fin is 1/8 balsa sheet and 1/32 plywood reinforcement; rudder is built up balsa; wing is bolt-on.

The Jouster kit is \$49.95 + \$6.00 S&H. An ARF kit is available for \$139.00 + S&H.

For trimming or covering the model, light weight tissue (including instructions) is available in yellow, red, orange, blue or black. Shipped with kits only, the cost is \$4.95.

If purchasing a mini hi-start with any kit, the cost is \$22.95 + S&H. The mini hi-start has thirty feet of 1/8 rubber, 120' day glow colored tow line, wood reel kit



and instructions. It is especially designed for 1.5 meter launching.

Sky Bench Aerotech, 58030 Cyrenus Lane, Washington, MI 48094; Ph/FAX (810) 781-7018. ■

### Silent Flight

...from Wise Owl Publications

*Silent Flight*, a unique British magazine that concentrates exclusively on model gliding and electric powered soarers, is now available by subscription to all North American enthusiasts from an easy-to-access U.S. source. Coverage includes a wide spectrum of interest, from thermal to slope, scale, and all international classes. *Silent Flight* will show you how to build and fly gliders, discusses the equipment you'll need, and offers expert advice on kits, motors, and radios.

*Silent Flight* is published six times a year and a one year surface subscription costs \$35. Airmail rates are available on request. To order this informative magazine, simply send your check or money order to Wise Owl Publications, 4314 W. 238th Street, Torrance, CA 90505. Or you may order your subscription with VISA or Mastercard at the following telephone numbers: (310) 375-6258, FAX (310) 375-0548. ■

### Shipping Containers

...from Pro-Case

Pro-Case was designed for sailplane flyers by sailplane flyers. Protection of your investment and ease of use were the only two design goals! Good looks were a bonus by product. Pro-Case gives ultimate protection with aluminum edged - stainless steel corners - interlocking top - stainless commercial piano hinge - cam locking top and full instrument grade foam lining.

Ease of use was achieved by designing the case to top load and making it partitionable in 1" increments. Why have to "pack" your sailplane before you "pack" your sailplane? We wanted a travel case that all you had to do was open the case, assemble the plane, and fly.

The sailplane cases have three spring loaded flush carrying handles. One on the top and one on each end. The two end handles are convenient if you want

to car top the case and use them as tie downs.

Two sizes are available, each with its own design goal. SPC-1 was developed for 1 Open class sailplane, and SPC-2 was designed for 2 Open class sailplanes. Both cases will accommodate one extra sailplane with a little planning. The matching Transmitter case is constructed exactly like the sailplane cases except it has one latch and one luggage style handle. It will hold two transmitters upright in absolute safety.

All cases are available in three standard colors; Red, White and Blue. Special colors or multiple colors are available for a small upcharge. Special sizes are also available and are quoted on an individual basis. Pro-Case is available exclusively through: Mikes Hobby Hanger, "A Place To Hang Planes" 1740 South I-35E, Carrollton, TX 75006, (214) 242-4930 -or- Henry Bostick, 5517 Hidalgo Court, Garland, TX 75043, (214) 279-8337 (eve). ■

### The Adventures of Cliff Hanger



by Wayne Thomas

## R/C Soaring Resources

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

### Contacts & Soaring Groups

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

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

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

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

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

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

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

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

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

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

Maine - DownEast Soaring Club (Northern New England area), Steve Savoie (Contact), RR#3 Box 569, Gorham, ME 04038; (207) 929-6639.

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

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

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

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

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

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

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

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

### Seminars & Workshops

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

### 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 \$7.00, 1984 for \$7.00, 1985 for \$8.00, 1986 for \$8.00, 1987 for \$9.00, 1988 for \$9.00, 1989 for \$10.00, 1992 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, outside U.S.A. for \$80.00. Last 4 (1987-1992) in U.S.A. is \$45.00, outside is \$50.00. Allan Scidmore, 5013 Dorsett Dr., Madison, WI 53711.

### BBS

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

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

## NASSA North American Scale Soaring Association

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

## F3B/USA • F3F/USA

### RC SAILPLANE TECHNICAL JOURNAL

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

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

## LSF



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

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

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



## The Vintage Sailplane Association

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

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

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

### *(The Wing Is The Thing)*

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

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

### You are invited to join the NATIONAL SOARING SOCIETY

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

For info., Contact NSS Secretary/Treasurer

Robert Massmann  
282 Jodie Lane  
Wilmington, OH 45177  
(513) 382-4612



## Schedule of Special Events

Date	Event	Location	Contact
June 11	1.5M Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
June 11-12	XC Race - SCSA	California Valley, CA	Keven Anderson, (805) 296-5126
June 11-12	Nebraska Soaring Open	Lincoln, NE	Loren Blinde, (402) 467-4765
June 11-12	BASS 2nd Annual HL & 2m	Baltimore, MD	Frank Weston, (410) 974-0968
June 11-12	2m - Unl	Morrison, FL	Bob Wargo, (813) 938-6582
June 18	Ohio Cup Thermal A&C	Dayton, OH	Jim Martin, (513) 376-9046
June 19	Ohio Cup Thermal B&D	Dayton, OH	Jerry Shape, (513) 843-5085
June 18-19	WRCC Spring Fling	Wichita, KS	Pat McCleave, (316) 721-5647
June 18-19	Cross Country	Portland, ME	Steve Savoie, (207) 929-6639
June 19	S.O.A.R. Contest	Illinois	Tom Kallavang, (708) 520-4565
June 25-26	Electric Fly	Pebble Creek, WI	Al Scidmore, (608) 271-5500
June 25-26	Flatland Open	Hillsdale, KS	Ed Kempf, (913) 780-5543
June 23-26	Mid-South Championships	Memphis, TN	Bob Sowder, (901) 757-5536
June 26	CMRC 2m, Open, HL	West Westboro, MA	James Reith, (508) 765-9998
June 26	SASS Novice Classic	Seattle, WA	Sherman Knight, (206) 455-2345
July 2-3	F3B	Grand Rapids, MI	Rich Burnoski, (708) 759-5220
July 4	Short High Start Unl.	North Texas	Al Sugar
July 9	MTS Contest	Milwaukee, WI	Al Scidmore, (608) 271-5500
July 9	10th Annual HL (A)	Dayton, OH	Gale Leach, (513) 429-2543
July 10	Open B&D	Dayton, OH	Bob Massman, (513) 382-4612
July 10	XC Fun Fly	Mead, NE	Christopher Knowles, (402) 330-5335
July 16-17	COGG XC - Cookstown	Ont., Canada	Jack Nunn, (705) 728-4467
July 16-24	AMA NATS	Lubbock, TX	AMA
July 17	S.O.A.R. Contest	Illinois	Rich Burnoski, (708) 759-5220
July 23-24	Inter Glide F3J	Birmingham, England	Jack Sile, 0449-675190
July 24	1.5M HL Contest	Dominguez Hills, CA	Merrill Farmer, (310) 923-2414
July 28-3	EAA Fly-In	Oshkosh, WI	
July 30-31	20th Annual Thermal	Montreal, Canada	Etienne Dorig, (514) 449-9094
Aug. 6-13	LSF Nationals	Muncie, IN	Mike Stump, (616) 775-7445
Aug. 6	Hand Launch	Poway, CA	Bill West, (619) 222-5296
Aug. 7	Sailplane Contest	Appleton, WI	Al Scidmore, (608) 271-5500
Aug. 8 (eve.)	1.5m Mini Hi-Start	Muncie, IN	Ray Hayes, (810) 781-7018
Aug. 13-14	2m - Unl	Morrison, FL	F. Stronumer, (813) 844-7225
Aug. 13-14	Holland Glide	Amsterdam / & Aug. 20-21	Amay Belgium
Aug. 14	F3J	Modesto, CA	Dave Darling, (209) 521-5412
Aug. 21	S.O.A.R. Contest	Illinois	Bill Christian, (708) 259-4617
Aug. 27	Sailplane Contest	Milwaukee, WI	Al Scidmore, (608) 271-5500
Aug. 27-28	2m - Unl (Hand Tow)	Morrison, FL	E. Wilding, (904) 375-0918
Sept. 2-5	USA F3B Team Selection		
Sept. 3-4	Unlimited	Morrison, FL	K. Goodwin, (904) 528-3744
Sept. 10	1.5M Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Sept. 10-11	F3J - Germany - Heerieden	Bavaria	Jack Sile, 0449-675190
Sept. 17	1.5M Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Sept. 17-18	SIG/EISS Glider Contest	Blakesburg, IA	Jim Porter, (800) 524-7805
Sept. 18	S.O.A.R. Contest	Illinois	Wayne Fredette, (708) 532-3904
Sept. 24	SASS Novice Classic	Seattle, WA	Sherman Knight, (206) 455-2345
Sept. 24-25	TNT	Austin, TX	George Parks, (512) 443-7029
Sept. 24-25	2m - Unl	Orlando, FL	Ed White, (407) 321-1863
Sept. 25 & Oct. 2	2m Postal - Details	5/94 RCSD - Everywhere	Steen Hoej Rasmussen
Sept. 25	F3J SOAR-IN	Madison, WI	Al Scidmore, (608) 271-5500
Oct. 1	Fall Slope Fun Fly	Madison, WI	Al Scidmore, (608) 271-5500

Oct. 1	1.5M Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Oct. 1-2	CVRC Fall Soaring Festival	Visalia, CA	Phil Hill, (209) 686-8867
Oct. 8-9	2m - Unl	W. Palm Beach, FL	J. Wilson
Oct. 9	SASS Novice Classic	Seattle, WA	Sherman Knight, (206) 455-2345
Oct. 9	1.5M Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Oct. 9-10	S.O.A.R. Fun Fly	Illinois	Stan Watson, (708) 448-6371
Oct. 15	1.5M Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Oct. 22-23	2m - Unl	Morrison, FL	Bob Wargo, (813) 938-6582
Oct. 23	S.O.A.R. Contest	Illinois	Wayne Fredette, (708) 532-3904
Nov. 6	S.O.A.R. Turkey Shoot	Illinois	Tom Blood, (708) 377-8641
Nov. 25-27	22nd Annual Tangerine	Orlando, FL	J. Smith
Dec. 3	Hand Launch	Poway, CA	Bill West, (619) 222-5296

### The First F3J Soaring Contest In Northern California

August 14, 1994

...by Dave Darling  
Modesto R/C Club

All radio control soaring pilots are invited to participate in a day of hand tow fun! The Modesto R/C Club is sponsoring an F3J (hand tow, man-on-man) contest utilizing the current rules as provided by the CIAM in Paris. The flying site will be the Beyer High School athletic field, located between Sylvan Meadows Drive and Sylvan Avenue on the north and south, and just east of Coffee Road, in northeast Modesto. On field registration will be from 0800 hours to 0845 hours. The pilots meeting will begin at 0845 hours. The contest will officially begin at 0900.

Trophies will be awarded for first, second and third place finishes. The entry fee will be \$5.00 for those registering by mail with post marks on or before July 30, 1994. Entries post marked after that date will pay a \$10.00 entry fee. Early entrants will have first choice of primary frequencies. Late entrants will be restricted to frequency choice. AMA membership required. FCC license required for ham band transmitters. Competitors are requested to have an alternate frequency.

For a copy of the CIAM F3J rules as published in the September, 1993 issue of *SOARER*, the newsletter of the British

Association of R/C Soarers, and the 2/3/4-1994 issue of the Modesto R/C Club newsletter, *Thermal Topics*, please submit \$1.00 and a stamped, self-addressed envelope to the contest director, Dave Darling, 2705 Harvest Road, Modesto, CA 95355-3430. ■

### WINGS

...from Ray Hayes

WINGS is a flight achievement program for 1.5 meter R/C sailplane pilots. Six levels include DURATION - LANDING - AEROBATICS for either HAND LAUNCHED or HI-START LAUNCHED models. This program is designed to focus 1.5 meter R/C sailplane pilots on improving their flying skills as they earn their way to the top level.

A periodic newsletter lists achievers, flying and building tips, fun fly and contest information, and articles pertaining to flying 1.5 meter sailplanes.

To receive an achievement voucher, send \$2 cash or check to Ray Hayes, 58030 Cyrenus Lane, Washington, MI 48094. This is a Great Lakes 1.5 Meter R/C Soaring League program. ■



## NASSA News

...from Gregory Vasgerdsian  
Concord, California

NASSA Achievement Certificates are now on hand. These handsome certificates are 5.5" x 8.5" and are printed in teal and black on a very nice quality parchment stock, and feature a Janus C sailplane speeding by. The Achievement program has been put in place for the individual scale builder and/or flier to have an ongoing record of achievements and goals in scale. We think this program will be a lot of fun and hope it motivates you to do it in scale.

With the flying season upon us there have been some inquiries about NASSA event sponsorship. As a new club and one that doesn't meet regularly things take longer to get done. Regardless, all of the objectives of NASSA are now in place. All members can expect another mailing later this year, which will have an updated roster, updated scale sources and model specs list, and other scale soaring items of interest.

So just what is NASSA sponsorship, how do you get it and what does it do for your event?

NASSA's goal is to have one major fun fly each year in a different part of North America each year. Also, to support other scale events at the local level.

### How To Apply:

Simply inquire to NASSA, P.O. Box 7322, W. Richland, WA 99352.

### What NASSA Offers:

#### Mailing labels:

Either the whole roster or just of members in your surrounding area, state or states.

#### Advertising:

In publications like RCSD, MA, etc. The amount of advertising is dictated by how large of an event it will probably be. Keep in mind that RCSD has a one month lead time and the major publications have

a 3 month lead time!

### NASSA Pilot's Choice Award:

A beautiful engraved plaque for the modeler whose model is voted as the favorite by the entrants.

### NASSA Achievement certificates:

For NASSA members at the event who accomplish a given NASSA Achievement at the event, a certificate may be applied for and given to the entrant at the event at a cost of \$1.00 to the member.

### What NASSA gets back:

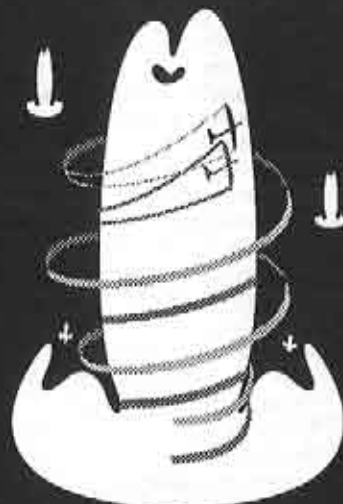
At this time NASSA is asking a very modest fifty (50) cents per scale entrant.

Get prepared to hit Utah in 1995! Bob Harman in Utah has already offered up the Point of Mountain site for NASSA's major scale rally in 1995. From all I have heard and read this is a world class slope soaring site (see RCSD, Nov. '91 page 8 for reference), and even without wind they have miles of open land, which would be excellent cross country terrain. We don't have a date yet, but will keep you posted. We also have word that this fall there may be a scale event at Harris Hill in Elmira, New York. This would make a wonderful event to make it to as it is a full size sailport, home of the Schweizer factory, and home of the National Soaring Museum. NASSA hopes to sponsor this event if it comes together, so look here for more information in the future. ■

### NASSA Notice

Two of our NASSA members, Robin Lehman and Dan Troxell, have been trying to communicate since last year with RZ Flugtechnik, one of the manufacturers on the NASSA resource listing. Until some sort of communication is forthcoming, we can not currently recommend them as a reliable source for scale sailplane kits. Robin says, "This is unfortunate indeed, as his kits were amongst the very best, and had the best prices!" ■

## SOAR TEXAS



### 10th Annual Texas State Soaring Championship Texas National Tournament September 24 - 25 Austin, Texas

Task - Thermal Duration 3, 5, 7, 9, 11  
w/AMA Landing

#### Classes:

2 Meter - Saturday

Open - Sunday

Junior, Novice

Sportsman, Expert

T.N.T.

#### Awards:

1 - 5th place, Sportsman & Expert  
1 - 3rd place, Novice & Junior  
Overall Winner

Sponsored by  
**Capital Area Soaring Association**  
Pre-registration Requested  
• 125 Entry Limit • AMA Sanctioned  
CD: George Parks • 2102 Oxford  
• Austin, TX 78704  
(512) 443-7029



## The MID-SOUTH SOARING CHAMPIONSHIPS & RCSD Show & Exhibition

MEMPHIS

MEMPHIS, TENNESSEE  
June 23 - 26, 1994

The largest four day  
sailplane contest in  
the South!

June 23 - 24

### CROSS COUNTRY

Awards: 1st - 4th place  
Junior/Senior/Open - Combined

June 24

### HAND-LAUNCH GLIDER

Awards: 1st - 3rd place  
Junior/Senior - Combined  
& 1st - 3rd place, Open

June 25 - 26

### UNLIMITED SAILPLANE

Awards: 1st - 5th place both days  
Novice, Sportsman, Expert  
& 1st - 3rd place both days, Junior

Due to the popularity of this contest, pre-registration is required by June 1, 1994. For complete information, write to Mike Kelly, 273 Sanga Road, Cordova, TN 38018, (901) 756-9410.

SPONSORED BY  
**MEMPHIS AREA SOARING SOCIETY**  
**NORTH ALABAMA SILENT FLYERS**  
**R/C SOARING DIGEST**  
AMA Sanctioned

## MSSC Update Mid-South Soaring Championships

...by Bob Sowder

Rich Spicer and Scott Meader from RnR Products will be teaming together with their SBXC cross country ship during the Mid-South Soaring Championships Cross Country Race. Fred Weaver will be teaming with Henry Bostick and the guys from Texas to give Rich and his team a run for the money. Perennial cross country winner, Pat Flynn, and his crew from Michigan will be teaming with Bob Sealy and flying the Sealy Catalina. Dave Godfrey and his able crew from Huntsville will be flying the RnR SBXC. We anticipate 10 to 15 teams to compete.

The Cross Country Race constitutes the first two days of the four day soaring event. The race will be held in Walls, Mississippi just across the Tennessee state border. The launch site is on a private grass runway and the course is approximately 27 miles long over flat delta crop land. Dates for the cross country event are June 23 and 24.

Hand launch glider is scheduled at the regular MASS soaring site in Brunswick, Tennessee on Friday June 24. Fun flying will also be open beginning at noon on Friday for anyone who does not have a frequency conflict with the hand launch entrants. As of this date, early May, we are anticipating 20+ contestants in HL.

We expect to see 100 to 125 contestants from at least 20 states to fly thermal duration on Saturday and Sunday, June 25 & 26. Four winches and retrievers will be set up to handle the onslaught of flight groups.

If you would like to receive a pre-registration brochure, or would like to reserve "booth" space at Modeler's Mall, call Bob Sowder days or evenings at (901) 757-5536. We expect this year's MSSC to be the best ever, and look forward to seeing everyone in Memphis! ■

The Mid-South folks have been extremely busy behind the scenes. The Modeler's Mall currently includes Airtronics (Tim Renaud), and Sealy Fiberglass (Bob Sealy). Bob Sowder says that the event raffle prizes already include: Tekoa Feather Cut, Wright Manufacturing fiberglass fuse, Soarcraft Servo Mounts, Slegers International 2M Spectrum & Deluxe Vertigo, Viking Models USA

## Advertiser Index

62	Aerospace Composite Products
65	AMAP MFG. Model Products
64	Anderson, Chuck
65	B <sup>2</sup> Streamlines
60	Clarke, John
66	Composite Structures Technology
76-77	C.R. Aircraft Models
64	D & D Specialties
63	Dave's Wood Products
63	Dodgson Designs
73	ICARE Sailplanes
73	Just Plane Fun Models
75	Kennedy Composites
67	Layne/Urwyler
64	Levoe Design
68	LJM Associates/ImagiSoft
60	Mike's Hobby Hanger/Henry Bostick
70	Quiet Flight International
62	RA Cores
74	RnR Products
73	Sky Bench Aerotech
BC, 72	Slegers International
71	Spectrum Ent.
63	Squires, Dave
63	Taucom
64	Tekoa: The Center of Design
60	The Birdworks
65	TLAR Enterprises
69	Viking Models, U.S.A.
74	Windspiel Models
62	Zatloka, George
75	Zoomit Creations

Condor fuselage, Bob Sealy fiberglass fuselage, Layne/Urwyler sailplane, RnR Products sailplane, Airtronics radio & unlimited sailplane, and certificates, coupons, software, etc., from: ACE RC, Aerospace Composite Products, Charles Lindsey, Chuck Anderson, Cox Hobbies, Futaba, Future Flight, Model Builder Magazine, Greco Technology, L. Star Models, Major Decals, Pacer Tech., Pierce Arrow, RC Modeler, Rocket City, Satellite City, Sheldon's Hobbies, Taucom, and Zoomit Creations.

On behalf of the Memphis Area Soaring Society and the North Alabama Silent Flyers, we thank them in advance for their support in helping to make the Mid-South Soaring Championships one of the largest events in the U.S.A. Thanks! *Ed.*

## Classified Advertising Policy

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

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

### For Sale - Business

**MINI HI START KIT** designed especially for 1-1/2 meter (hand launch). Thirty feet of 1/8 tubing stretches four times relaxed length for gentle launches. Two day glow colored tow lines, 120' and 150', use separately or together. \$29.95 + \$4.00 shipping. Sky Bench Aerotech, 58030 Cyrenus Lane, Washington, MI 48094; (313) 781-7018.

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

**PRECISION COMPUTER CUT FOAM CORES** for your sailplane. Any airfoil combination, washout, taper, sweep, skin thickness. No templates required. \$32 for typical four panel 2M. For complete info. send SASE to: Wings!, 3198 Shady Oak Lane, Verona, WI 53593; (608) 845-7961, eve. or leave message.

**SPRING IS HERE.** I can get you in the air in a hurry. Will build open, 2-meter, slope, hand launch and electric sailplanes. Please call Tom's Custom Building Service with inquiries, (612) 944-6246, 9:00 am - 8:00 pm CST.

"Model planes have kept part of our youth alive." One of over 670 quotes and stories by Frank Zaic in FRANKLY SPEAKING. \$6.95 plus \$1.25 postage. Model Aeronautic Publications, Box 135, Northridge, CA 91328.

### Do You Need Help With Ad Copy?

One source for help with ad design & typesetting: Barry Kurath  
105 N.E. 61st #12, Portland, OR 97213  
(503) 236-4067

### For Sale - Personal

SYNERGY 91, white, green trim, NIB, 4 Airtronics 141 servos, 2 Airtronics standard 102s, 800 mah battery pack... \$600.00 firm; ELIMINATOR 60, HL, modified (V-tail), very competitive, Airtronics Receiver and 2 micro servos installed, 250 mah battery pack, RTF... \$200.00. Keith Mclellan @ (305) 383-1539, FL.

Airtronics LEGEND, RTF, foam & balsa 3021 wing, complete with 6 Airtronics servos. Just add receiver and go flying. Must see, perfect condition, never flown, new finish... \$400.00. Michael Barnett @ (818) 889-7194, Calif.

A-10 WORTHOG slope soarer, 72" glass fuse, 79" 1 pc. wing. Wing construction: contest balsa over white foam w/Sitka spruce spar, all glassed & painted w/kevlar hinges on flaps and ailerons. Tail: all contest balsa & spruce. This BIG scale power slope soarer was put together from a Geo. Miller custom R/C twin engine ducted fan kit and is fully painted in a "JAWS" camo. paint scheme. Flying weight is 112 oz., flown several times... \$500.00 w/6 Airtronics servos & a 1400 Mah battery pack. Jim Bonk @ (203) 677-7951 after 6 pm EST, Conn.

GENESIS, built, wired, brand new, ready for radio... \$450.00; GENESIS, like new... \$400.00, with airborne... \$700.00, and with Airtronics transmitter (see below)... \$950.00, or any combination call; Airtronics computer radio with ATRCS 3.0 (1993) enhancements, 8 channel, 8 setup memory, 3 - PCM 8 channel receivers (92985), servos include 401's & 141's... \$550.00. Plus shipping. Larry Storie @ (517) 626-2290 eve, Michigan.

"REACTION" F3B ship, used in last team selections, RG-15, T-tail, similar to COMET 89T, excellent condition, includes Becker wing servos, 1200 mah battery pack, Airtronics wiring harness... \$575.00. Lenny Keer @ (303) 737-2165, Colorado.

Glider collection! Best offer! All built: Multi-plex - DG-300/glass, DG-600, DG-500, KA6E, ASW 22; All kits: Robbers - DISCUS, GROB 103, DG 202. Bob Simmer @ (619) 549-4131, Calif.

Robbe ASW-27 (German) 3.5m, HQ 3-14, optional flaps, NIB... \$525.00; Simprop SAGITTA (German), 2.2m, semi-scale/acrobatic, NIB... \$250.00. Bob @ (619) 753-8146 'til 10 pm, Calif.

FALCON 880E, includes 141 flap servos, 401 aileron servos, 401 elevator and rudder servo, Ace filters on every servo line (6), Graupner Ultra 1600 motor, Micro Mos 400 speed control, carbon prop and spinner, 1100 14 cell battery pack by SR, beautifully built & finished, all worth over \$1200.00, sacrifice at \$675.00, pictures upon request. Hans Wiederkehr, 4 Gary Place, Selden, NY 11784; (516) 696-3361.

VECTOR, 90", RTF, wingeron, complete w/ Airtronics 7 channel radio, like new... \$400.00 + shipping. Mike @ (714) 960-2835 (anytime), So. Calif.

Müller COMET 88A, NIB, fuse painted with Black Baron primer. Wing: three piece, natural wood, carbon fiber, RC-15 airfoil. Slip on/off nose cone type fuse, used for thermal, F3B & slope racing... cost \$700.00 asking \$500.00 and you pay shipping. Jerry @ (408) 462-2827, N. Calif.

## Wram Show 94

A new video taken at the 1994 Wram Show. VHS, only. \$7.95 includes S&H.

For more info. on other videos available, send S.A.S.E. to:

John F. Clarke, 911 Covert Ave., N.H.P., NY 11040-5401

SHIPPED 1ST CLASS, PRIORITY MAIL

## THE RUBBER DUCK 100% BUILT "ELASTIC SLOPER"

Uses STD. Servos, RX, & 500 Batt. Just Press In Your Radio & Fly Mixer & Linkage Installed - for Elevons

Flexible Foam Used Throughout 36" Span w/8 oz. Loading Requires 2 Channel Radio Red, White, or Blue



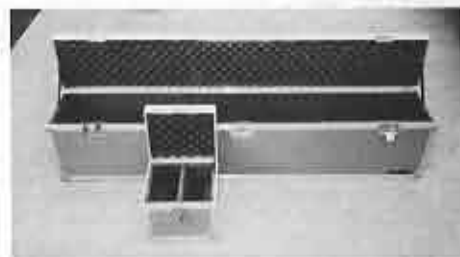
THE BIRDWORKS P.O. Box 1302 Port Orford, OR. 97465 (503)332-0194 \$50+7.50 s&h

## Pro-Case

The Ultimate in Protection for your Sailplane and Radio

SPC-1	SPC-2	TXC-1
(1-2 Planes)	(2-3 Planes)	(2 TXs)
62" Long	62" Long	\$65
8" Wide	11" Wide	
11" Deep	15" Deep	
\$229	\$249	

Plus Shipping  
Visa - M/C - Discover  
Texas Residents  
add 8.25% Tax



Features: All edges are aluminum extrusions, all corners are stainless steel capped, top tongue and groove interlock with case. Full span commercial grade stainless steel piano hinge. Cases are divided in one inch increments and key lockable. Completely lined with high impact instrument foam. Flush spring loaded handles with flush 3 point camlocks. Available in Red, White or Blue. Custom or multiple colors available for \$10 extra. Top ride safety straps. Does not need "Top Loading" when shipped. Custom cases available - call for quote.

Available Exclusively from

Mikes Hobby Hanger, 1740 South I-35E, Carrollton, Texas 75006 (214) 242-4930

Henry Bostick, 5517 Hidalgo Court, Garland, Texas 75043 (214) 279-8337

## R/C Soaring Digest

P.O. Box 2108  
Wylie, Texas 75098-2108  
(214) 442-3910  
FAX (214) 442-5258

## R/C Soaring Digest

A Publication for the  
R/C Sailplane Enthusiast

### Back Issues

We receive many inquiries every month about the availability of back issues for *R/C Soaring Digest (RCSD)*. So, we try to print sufficient quantities each month for those of you who wish to obtain back issues or want additional copies. We hope you enjoy *RCSD* but, if you are NOT satisfied, please return them for a full refund, no questions asked!

(Quantities are limited for some months.)

	1992	1993	1994
January	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
February	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
March	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
April	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
May	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
June	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
July	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
August	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
September	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
October	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
November	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
December	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Subscription Costs

USA: \$21 Bulk/Third Class  
OR \$30 First Class  
(Texas res., please add \$1.52 tax.)  
Canada & Mexico: \$30 Air  
Europe/U.K.: \$45 Air  
Asia/Pacific/Middle East: \$52 Air

RCSD is usually mailed the first week of the month. For example, the January issue would be mailed the first week in January. Please allow 4-6 weeks for U.S.A. delivery by Bulk.

### Subscription Renewals

RCSD mails out one post card size renewal notice in the U.S.A. Outside of the U.S.A., the renewal notice is placed in an envelope.

### How To Read Your Label for Expiration

214 1ST 94/01

214 - The first entry is the subscription number.

1ST - This is a first class subscription in the U.S.A.

3 - 3rd Class U.S.A.

A - Airmail Outside U.S.A.

S - Surface (No longer offered.)

Other - Tracking codes. (V, for example means advertiser.)

94/01 - The subscription is good through the December, 1993 issue. It must be renewed prior to January 1, 1994, or it will be logged in as a new subscription.

- Please renew my current subscription.
- Please enter my new subscription to the *R/C Soaring Digest*.
- Please send the back issues I have selected.

Name \_\_\_\_\_

Address \_\_\_\_\_

(Check or Money Order, only, please. U.S. funds.)



## Affordable Custom Cores for modelers, by modelers

Custom computerized cutting services. Spans to 56", chords to 27" .001" accuracy or better. Gray or white foam. Raw cores or full custom glider wing kits with balsa or obechi sheeting and spar materials available (stabs too)

Obechi in stock - Presheated wings now available

"Rule of thumb" presheated wing estimates - \$50 + \$50 per meter of span

Presheated cores come ready to join and add root ribs and radio

Rejuvenate your floater with a new airfoil/wing

Gentle Lady or Spirit 2M full wing kits - \$35 - S3021 or SD7037

Large Postscript airfoil library including Soartech foils

Call and let us work with you on your next project

All orders add one \$5 S&H charge - COD \$6 additional

**RA Cores**, P.O. Box 863, Southbridge, MA 01550 or (508) 765-9998

## NEW AUTO-VAC SYSTEM

Introducing the new fully automatic vacuum bagging system that is completely self-monitoring. It has a fully adjustable vacuum switch and a large capacity reservoir which prevents frequent cycling of the vacuum pump.

The Auto-Vac kit comes completely assembled, mounted on a wood base, and ready to use. Included in the kit are the E-Z Vac II electric pump, rated at 24 Hg, adjustable vacuum switch, vacuum gauge, large capacity reservoir, check valve, neoprene tubing, E-Z Vac connector, two Quick-Lock seals, 9' of 18" wide bagging tube, 9' of 15" wide breather cloth and a set of vacuum bagging instructions.



**\$215<sup>00</sup>**  
complete

230 V System available.  
Add \$7.00 for S&H. Check/M.O./C.O.D.  
M.C. /VISA accepted. CA residents add 7.75% Tax

**Aerospace Composite Products** 14210 DOOLITTLE DR., SAN LEANDRO, CA 94577  
(510) 352-2022 • (510) 352-2021

## "FLYING BUDDY" Transmitter Support



Great news from  
"Flying Buddy"!

George Zatloka, 12212 NE 66th St., Kirkland, WA 98033; (206) 827-1960

The brand new and improved "Flying Buddy" transmitter support is now available. The new design utilizes a snap-on, quick release to secure the transmitter, which is a simple and fast way to engage or disengage the transmitter from a tray, today. Slick! Additional length has been added to the vertical arms of the tray to increase stability. These and other improvements have simplified the manufacturing process so we can offer "Flying Buddy" at a lower price!

\$48.00 + \$6 for S&H



## Introducing the 2-meter Wee-gilante

### Specifications:

Wing Span: 78 in  
Wing Area: 585 in<sup>2</sup>  
Flying Wt: 37 oz  
Wing Loading: 9 oz/ft<sup>2</sup>  
Airfoil: SD7037  
Wing Construction: Foam core, spruce/carbon fiber spar, obechi skin.  
V-Tail Construct: Lightweight built-up

Fuselage Construction: fiberglass MonoSeam

This regal looking 2-meter is an exciting V-tail glider that handles like a dream!

See our complete line of high performance kits for the serious builder/flyer: the 60"/72" Pivot for \$85, the 78" Wee-gilante for \$165, the 100" V-gilante for \$175, the 134" Anthem for \$250 or the 121" Sabre for \$275. Ship extra.

**Note: low factory-direct retail only prices (Visa and MC Bankcards welcome)!**

Send 2 Stamps for our complete catalog. Send \$1 for an issue of "Second Wind".  
DODGSON DESIGNS - 21230 Damson Rd, Bothell, WA 98021 • (206) 776-8067

## RUBBER DUCKY ANTENNA

★ R/C Power Duck ★

✦ Individually hand-tuned for 72 Mhz aircraft ✦ BNC connection installs easily onto Airtronics transmitters (Vanguard and newer). Futaba/JR adapters available ✦ 12" in height; black, blue, red, pink, yellow colors ✦ Electronically efficient with lowest SWR match and highest RF output ✦ Excellent range without compromise ✦ Avoid the problems and dangers of telescopic antennas ✦ \$23.95, \$2.00 for JR/Futaba adapters, CA residents add 7.75% sales tax, \$3.00 S&H

**TAUCOM**, 2490 S. Ola Vista, #28, San Clemente, CA 92672  
(714) 492-9553, FAX: (714) 586-8508



## Dave's Wood Products

Obechi Available in  
Large Sheets

Please call (509) 548-5201

or send SASE to:

12306 Bergstrasse  
Leavenworth, WA 98826

## Case-Hardened Tool Steel

☆☆ WING RODS ☆☆

For All Sailplane Types

☐ Guaranteed to NEVER set a bend on the winch or in flight! ☐ Competition Proven!  
☐ From 5/32" to 1/2" Dia.; 7" to 25" Lengths  
☐ Falcon 880 Drop-In Repl. \$10.00 Incl. S&H

**SQUIRES MODEL PRODUCTS**  
935B LA MESA TER, SUNNYVALE, CA 94086  
(408) 245-8111

Send SASE for Free Price List

# NOW AVAILABLE IN 2 VERSIONS!



**SUPER**  
SAILPLANES



**SUPER V** is one of the highest performance open class competition thermal sailplanes available. It is capable of maximum height vertical zoom launches, excellent cruise distance and thermal indication, along with a rapid rate of climb in lift. Landing approaches are very controllable with effective flaps on a lightly loaded airframe.

Wing Span: 110"  
Wing Area: 900 sq.in.  
Weight: 68 oz.  
Aspect Ratio: 13.44  
Airfoil Wing: S07037  
Airfoil Stabilizer: S08020  
Loading: 10.8 oz sq.ft.

Features: Fiberglass Kevlar epoxy fuselage and canopy. Pre-painted vacuum-bagged carbon, glass wings and stabilizers. Ailerons, flaps and servo holes pre-cut. Fuselage predrilled for wing rod and tow hook. Pre-installed tow hook and V-tail block. Triple taper wing. Bolt on V-tail servos in tail. Basic A.R.F. #579, Basic Kit #189.

**SUPER V 2 Meter** is a natural evolution of the SUPER V. It will easily handle full "pedal-to-the-metal" zoom launches to heights approaching its big brother. At 40oz. with a 9.5oz. per sq.ft. wing loading, thermal climb performance, cruise and landing control is excellent. Wins include the Pasadena Two-Day and many Southern California contests.

Wing Span: 78.5"  
Wing Area: 610 sq.in.  
Weight: 40 oz.  
Aspect Ratio: 10.10  
Airfoil Wing: BS 15  
Airfoil Wing (optional): S07037  
Airfoil Stabilizer: S08020  
Loading: 9.5 oz sq.ft.

Features: Fiberglass Kevlar epoxy fuselage and canopy. Pre-painted vacuum-bagged carbon, glass wings and stabilizers. Ailerons, flaps and servo holes pre-cut. Pre-installed wing end V-tail mount and tow hook. Bolt on wing and V-tail. Basic A.R.F. #429, Basic Kit #149.

**Levoe Design**

We are a direct distributor. For more information, please send a SASE. To order or to inquire about servos & special aircraft packages and prices call or write:  
510 Fairview Ave., Santa Maria, CA 91024, Tel.: (818) 355-2992

**AMAP**  
MODEL PRODUCTS

## Precision AMAP Wing Cutter

2943 Broadway, Oakland, CA 94611  
(510) 451-6129, FAX: (510) 834-0349  
Butch Hollidge

- Foam Cutting Jigs
- Joiner/Stab Drill Jigs
- Custom Jig Making
- Custom Quotes



- Single Wire Tracking
- Needle Bearings
- Quality Aluminum Construction
- Cuts straight or any taper - wings, fins, stabilizers
- BOW SIZES: 20", 30", 40", 60", 80", Custom
- Sales, Replacement, Warranty Service, No Training.

\$395.00 Includes:  
2 Bows, 2 Bench Pulleys  
(Completely Assembled)  
As Shown

The Kit Makers Choice - For Professional Use Only



**BAE HAWK**  
Power Scale Slope

Fiberglass fuselage  
Foam core wing & stabs  
with Obechi sheeting  
Cad drawings

Wing Span 47.5"  
Wing Area 336 sq. in.  
Aileron/Elevator control  
Full flying anhedral stab control system

Price: \$120.00 plus shipping (CK or M.O.)

TLAR Enterprises - 14221 46th Pl. W., Lynnwood, WA 98037 (206) 743-9358 PST

## "THE NEST"

A PERFECT CONTAINER FOR RC MODELS!  
SHIP IT-TRANSPORT IT-STORE IT!  
CONVERTS TO FIELD STAND!

WE'RE SPEAKING FROM 20+ YEARS OF EXPERIENCE!  
MOST POPULAR SIZES AVAILABLE:  
(S&H IN U.S.A. INCLUDED)

- ✓ 7"X13"X52" \$79.95  
(FITS MOST STANDARD AND 2 M WITH 50" MAXIMUM FUSELAGE LENGTH)
- ✓ 7"X13"X57 (FALCON) \$84.95
- ✓ 7"X15"X60" (SUPER-V) \$89.95
- ✓ 7"X13"X62" (EAGLE) \$89.95
- ✓ ACCESSORY KIT \$17.95  
(\*2 PILLOWS, "PERCH", "BLANKET")
- ✓ CUSTOM - NEED A SPECIAL SIZE? CALL OR WRITE FOR QUOTE. PRICES BASED ON BOX SIZE & MAT'L REQ'D.

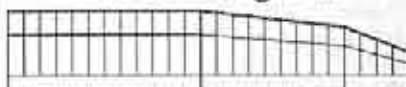
- ✓ PACK-LITE™ NEST MATERIAL
- ✓ NYLON SHIPPING STRAPS
- ✓ COMPRESSION STRENGTH OF 3700 LB./FT.
- ✓ EASY TO LABEL W/CARTER'S MARKS-A-LOT PERMANENT MARKER - RMV. W/ISOPROPYL ALCOHOL

**D&D SPECIALTIES**

7935 S. NEW HAVEN, TULSA, OK 74136  
(918) 492-3760 - FAX (918) 492-5641  
WE ACCEPT VISA & MASTERCARD!

## NEW

### Model Design 4.0



New features include screen display of airfoils and wing plans, automatic foam core templates for Feather Cut hot wire foam machine, and improved ease of use. Other features include:

- Any PC using MS-DOS 3.2 or later (286 or better with math coprocessor recommended for LaserJet printers).
- CGA, EGA, or VGA graphics adapter required to display airfoils and plans
- Alter camber, thickness & combine foil
- Supports most popular dot matrix and HP LaserJet printers

Model Design Program ..... \$50

Airfoil Plot Program ..... \$35

Send SASE for more information or call (615) 455-6430 after 7 PM central time.  
Chuck Anderson, P.O. Box 305  
Tullahoma, TN 37388

## Structural Dimensioning of Radioguided Aeromodels

by Dr. Ing. Ferdinando Galè

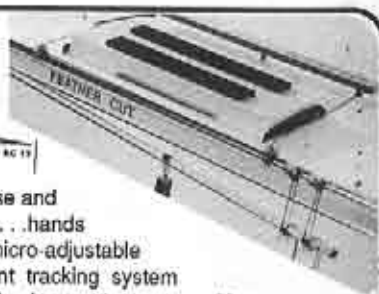
Beginning with a description of balsa's characteristics, Dr. Ing. Galè describes the materials and methods of building model aircraft structures which will withstand the stresses of intense flight. From sticks and sheets to foam and fiberglass, Dr. Ing. Galè explains it all. Some simple math skills are required, but numerous examples assist with understanding.

105 pages, 8 1/2" x 11", fully illustrated

US\$18.00

B<sup>2</sup>Streamlines, P.O. Box 976, Olalla WA 98359-0976

HOT-WIRE FOAM WINGMACHINE™



"FEATHER CUT" creates a new standard in the ease and accuracy of cutting white or blue foam wing cores . . . hands off! Precise single wire tracking in concert with micro-adjustable balance weights guided by an exclusive three-point tracking system guarantees ripple-free surfaces. No more trailing edge burn-out common with two wire systems. Couple "FEATHER CUT" with Tekoa's "THERMAL GENERATOR" for fool proof temperature control and you'll be a "Pro" . . . first time out.

- Cuts straight or taper wings, fins and stabilizers — automatically.
- Mounts with tape to the edge of any workbench, even your dining table and stores in its own heavy duty mailing tube.
- Complete kit with anodized and plated components - no hardware store trips.
- Instructions include "cutting your first wing", "making templates" and more.
- 28" fold-bow. 40" and 52" available.
- Power supply required.
- Guaranteed to out perform the rest.
- "Simply" the best!

FEATHER CUT  
\$149.50 + 8.50 S&H  
THERMAL GENERATOR  
POWER SUPPLY - \$119.50 + 4.50 S&H



TEKOA: THE CENTER OF DESIGN  
3219 CANYON LAKE DRIVE  
HOLLYWOOD • CA • 90068  
PH 213-469-5584, FAX 213-469-3006

FEATHER/CUT GOES CAFC®  
WITH CompuFoil Professional  
"COMPUTER ASSISTED FOAM CUTTING"

-CompuFoil calculates Feather/Cut taper ratios  
-CompuFoil auto-draws Feather/Cut templates  
-and much more!  
\$75.00 plus \$3.00 S&H

## THE VERSATILE EPOXY SYSTEM

# WEST SYSTEM®

◆ Sands Easily    ◆ No Mess Metering Pumps

◆ Very Long Shelf Life    ◆ Full Line of Fillers

◆ One Resin - Four Hardeners◆◆◆◆

Bonding    Coating    Fairing  
Filleting    Laminating    Repairs

Dealer & Manufacturer Inquiries Welcome  
For Detail Product Information Send \$3 to:



**Composite Structures Technology**  
P. O. Box 642, Dept. MH, Tehachapi, CA 93581  
Order Desk: 1-800-338-1278

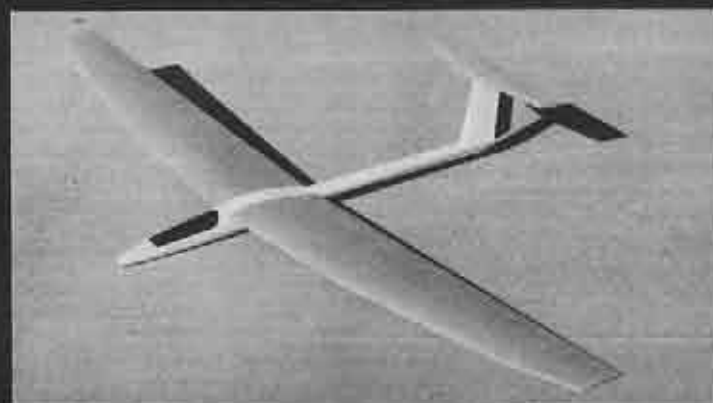


Designs by Layne / Urwyler

1808 Applegate Dr. Modesto, CA 95350 (209) 529-8457 FAX (209) 549-1642

## ★ Saturn 2.0 ★

Saturn 2.0 is our exciting new two meter that shares a lot of the design and flying characteristics of our successful, contest winning, Saturn 2.9T -- with one small twist. It can also be built as a V tail.



### Specifications:

Airfoil:	HQ 3/10 - 3/9
Planform:	Triple taper
Wing:	Foam/Obeche
Fuselage:	Glass/Kevlar
Wing Loading:	9 - 10 oz sq ft
*Standard or V tail*	

Kit price:	\$149.00
Pre-sheeted:	\$239.00

FOR PERFORMANCE OUT OF THIS WORLD



# MaxSoar/PC-Soar

Sailplane Performance Analysis Programs for the Macintosh and PC compatible computers.

**Now Shipping: MaxSoar V3.0 and new MaxSection airfoil plotting software for the Macintosh!**

### MaxSoar/PC-Soar:

- On-line documentation.
- Use sailplanes provided or enter own.
- English/Metric capability.
- Reynolds Numbers effects calculated.
- Plot sink rate versus flying speed.
- Plot lift/drag versus flying speed.
- Overlay plots for comparison.
- Five designs and ten airfoils included.
- Calculate design parameters like: areas, aspect ratios, aerodynamic centers, average chords, tail volumes, instability factors, equivalent dihedral, recommended C.G. limits and more.

**MaxSoar Price: \$70.00**  
**Includes MaxSection V3.0.**

**MaxSoar V3.0 Requirements:**  
Apple Macintosh with a hard disk and HyperCard Version 2.1 or HyperCard 2.1 Player is required.

### MaxSection:

- Plot airfoil template with sheeting relief.
- Works with most Macintosh printers.
- Copy airfoil templates to Clipboard and paste them into CAD packages.
- Plot and overlay airfoil polar data.
- Use polars provided or enter own.
- Multiple Reynolds Numbers on polars.
- English/Metric capability.

**Now available separately!**

**MaxSection Price: \$25.00**

**MaxSection V3.0 Requirements:**  
Apple Macintosh with a hard disk and HyperCard Version 2.1 or HyperCard 2.1 Player is required.

**PC-Soar Price: \$40.00**

**PC-Soar V3.0 Requirements:**  
IBM PC, XT, AT, PS-2 or Compatible Computer, Floppy Drive, CGA, EGA, VGA or Hercules Graphics Adapter, Monochrome or Color Graphics, Graphics Compatible Printer or Printer Driver. **Unless specified, shipped on 3.5" HD floppy disk.**

### Expanded Libraries for MaxSoar and PC-Soar!

Sailplane Design Library includes 51 popular sailplane designs of various types. Airfoil Section Library includes over 228 wind tunnel and theoretical polars from MTB, SoarTech, Althaus volume 1, Althaus volume 2 and Princeton.

**Price: \$15.00 Each.** MaxSection, MaxSoar or PC-Soar are required.

**Also Available From LJM Associates:**

**Laser Cut Airfoil Templates** for precise wing sections with foam or builtup construction. Now available in one and two piece styles with heat resistant Teflon™ surfaces. **Prices as low as \$35.00**

**To order MaxSoar/MaxSection items, send price plus \$3.00 S & H to:**

**ImagiSoft**  
c/o John Hohensee  
S22 W27400 Fenway Dr.  
Waukesha, WI 53188  
(414) 521-2472  
after 5:30 p.m. weekdays

**To order PC-Soar/Laser Templates items, send price plus \$3.00 S & H to:**

**LJM Associates**  
c/o Lee Murray  
1300 N. Bay Ridge Road  
Appleton, WI 54915-2854  
(414) 731-4848  
after 5:30 p.m. weekdays



**Viking  
Models,  
U.S.A.**

**High Quality  
Fiberglass Fuselages  
& Vacuum Forming**

Jerry Slates  
2 Broadmoor Way  
Wylie, TX  
75098-7803 U.S.A.

**(214) 442-3910**

**FAX (214) 442-5258**

9:00 A.M. - 5:00 P.M. CST

### → Epoxy Fiberglass Fuselages for the Scratch Builder

The epoxy fiberglass fuselages listed here include suggested specifications (Wing Span/Airfoil/Radio Channels). All requests are done on a custom basis. We do not carry a large inventory, but rather custom make each fuselage as the orders are received. Please allow 6-8 weeks for delivery on partial kits and canopies.

### → Canopies & Accessories

An in-house vacuum form machine allows us to produce our own canopies. If you are looking for a canopy or other vacuum formed accessories (including sailplane, power, etc.), please let us know. We have a large inventory of canopies and do short production runs. Manufacturer inquiries are welcome.

### → Custom Mold Making

Please call.

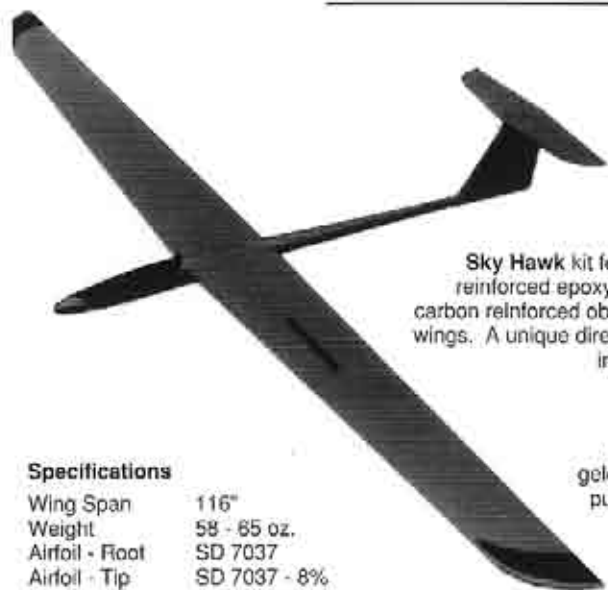
→ Check or money order only, U.S. funds, please. C.O.D. \$4.50 additional. Prices subject to change without notice. Texas residents, please add 7.25% sales tax. S&H costs are for continental U.S.A., only.

### NOW AVAILABLE

**1/5 Scale Ornith  
142" wing span**  
**1/5 Scale Orlice  
135" wing span**  
**1/5 Scale ASW-17  
135" wing span**  
**Stiletto RG-15**

Epoxy Fiberglass Fuselages	Price	S&H
1/6 Scale DFS Reiher V2 (120"/Scale/4) 46" fuse, canopy, plans	\$75.00	\$10.00
1/5 Scale ASW-19/20 (132"/RITZ III/4) 54" fuse, canopy, plans	\$75.00	\$10.00
1/5 Scale Nimbus (159"/Wortman/4-5) 54" fuse, canopy, plans	\$75.00	\$10.00
1/5 Scale Rhoenbussard (112.5"/Scale/4) 40" fuse, plans	\$75.00	\$10.00
1/5 Scale ASW-17 (135"/Mod. Eppler/4-5) 49" fuse, canopy, tray, dwg.	\$85.00	\$10.00
1/5 Scale Orlice (135"/E392/3-4) 49" fuse, canopy, tray, dwg.	\$75.00	\$10.00
1/5 Scale Ornith (142"/E392/3-4) 49" fuse, canopy, tray, dwg.	\$85.00	\$10.00
1/4 Scale DG-100/200 (147.5"/Wortman/4-5) 64" kevlar reinf. fuse, canopy, tray, docu.	\$175.00	\$20.00
1/4 Scale Libelle (154"/RITZ I/3-4) 58.5" fuse, canopy, frame, docu. pkg.	\$135.00	\$20.00
1/4 Scale Jantar (187" or 202"/Wortman/4) 67" fuse, canopy, plans	\$145.00	\$20.00
1/4 Scale HP-18 (147"/RITZ III/4) 69" fuse, canopy, plans	\$135.00	\$20.00
1/4 + 10% Scale Salto (142.5"/RITZ I/3-4) 61" fuse, canopy, frame, docu. pkg.	\$135.00	\$20.00
1/4 Scale SZD - 30 Pirat (147"/Clark Y/4) 62" fuse, canopy, plans	\$135.00	\$20.00
1/4 Scale Kestrel (167" or 187"/RITZ/4-5) 63" kevlar reinf. fuse, canopy, frame, docu.	\$175.00	\$20.00
1/3 Scale ASW-19/20 (16.5"/Wortman/4-5) 89" fuse, canopy	\$250.00	Call
Semi-Scale ASK-14 (90" or 110"/flat bottom/4) (motor glider .15 cube in. or electric)		
40" fuse, canopy, plans	\$75.00	\$10.00
Condor 3m (bolt on wing mount/up to 10" chord) 52 1/4" kevlar reinf. fuse, nose cone	\$80.00	\$10.00
Contestant (148"/E205/3-4/10.5" chord) 60" fuse, canopy, tray	\$75.00	\$10.00
Elf 2m (bolt-on wing mount/up to 10" chord) 44 3/8" fuse, nose cone	\$65.00	\$10.00
44 3/8" kevlar reinf. fuse, nose cone	\$70.00	\$10.00
Factor (83"/E193/3) 41" fuse, hatch, plans	\$75.00	\$10.00
Oden (100-130"/S3021/As Req./10.25" chord) 51" fuse, canopy	\$65.00	\$10.00
51" kevlar reinf. fuse, canopy	\$75.00	\$10.00
Raven 3m (119"/Mod. E193/As Req./10.75" chord) 51" fuse, plans	\$70.00	\$10.00
51" kevlar reinf. fuse, plans	\$80.00	\$10.00
Smoothie (100"+/None/Var.) 49" fuse, hatch	\$65.00	\$10.00
Special Edition (100-130"/Any/As Req./9.625" chord/bolt-on wing) 54" kevlar reinf. fuse, nose cone	\$80.00	\$10.00
Stiletto I (100-136"/Any/As Req./10" max. chord/plug-in wing) 49" epoxy fiberglass fuselage	\$65.00	\$10.00
49" kevlar reinf. fuse	\$75.00	\$10.00
Stiletto II (100-136"/Any/As Req./10" max. chord/bolt-on wing) 49" epoxy fiberglass fuselage	\$65.00	\$10.00
49" kevlar reinf. fuse	\$75.00	\$10.00
Siletto RG-15 (100-136"/RG-15/As Req./plug-in wing) 49" kevlar reinf. fiberglass fuse	\$75.00	\$10.00
Zen (100"+/None/Var.) 51" fuse, hatch	\$75.00	\$10.00





*Introducing  
a new blend of  
technology  
in one neat  
package!*

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

Also available is an optional high gloss white gelcoat fuselage and rudder pushrod tube pre-installed.

#### Specifications

Wing Span	116"
Weight	58 - 65 oz.
Airfoil - Root	SD 7037
Airfoil - Tip	SD 7037 - 8%
Wing Area	900 sq. in.
Wing Loading	9.5 - 10.5 oz./sq. ft.
Aspect Ratio	15:1



#### Sky Hawk Attributes

- ✓ High aspect ratio wing
- ✓ "Swift" wing tip technology
- ✓ Thin airfoils at the wing tip
- ✓ Large control surfaces
- ✓ Large tail surfaces
- ✓ Long tail moment
- ✓ Exceptional performance
- ✓ Sleek lines and good looks
- ✓ Easy to handle
- ✓ Lots of room for radio gear

"I listened to what the sailplane community wanted in a sailplane, analyzed what I felt were the best of all the technologies available today, and merged them into a single package. I simply call it, Sky Hawk."

... Mark Allen, designer of the Falcon and Eagle series of sailplanes

Sky Hawk is packaged by Slegers International and flown by Brian Agnew.

*High Quality Electric & Non-Electric Sailplanes,  
Radios, and Accessories for the Sailplane Enthusiast*

## SLEGERS INTERNATIONAL



Route 15, Wharton, New Jersey 07885

(201) 366-0880 - FAX (201) 366-0549

9:30 A.M. - 5:00 P.M. (Closed Sun. & Mon.)

★ VISA ★ MASTERCARD ★ AMERICAN EXPRESS ★ DISCOVER ★

# A Classic is Back!

Just in Time for your Classic Sailplane Meet

THE RETURN TO BASICS...  
AND THE RETURN OF THE ORIGINAL

## BIG BIRDY

100" STANDARD CLASS  
SAILPLANE KIT

For Kit and Dealer Direct Information, Contact:

**JUST PLANE FUN MODELS**  
3390 Paseo Barbara Road  
Palm Springs, CA 92262  
(619) 527-1775

MADE IN U.S.A.

WINGSPAN: 100 INCHES  
WING AREA: 1045 SQ. INCHES  
FUSELAGE LENGTH: 49.5 INCHES  
RADIO FUNCTIONAL: 2 OR 3 CHANNEL  
W/SPOILERS

## LIL BIRD

R/C HL  
or  
HI START  
Sailplane  
Kit

(See RCSD 11/93 for full details.)

KIT: \$29.95 + \$6.00 S&H  
ARF: \$129.95 + \$20.00 S&H  
OR KIT PLUS MINI HI START:  
\$52.95 + \$7.00 S&H  
MI RES. PLEASE ADD 6% TAX.

**SKY BENCH AEROTECH**  
58030 CYRENUS LANE  
WASHINGTON, MI 48094  
Phone: (810) 781-7018

## SALTO H-101

Scale slope sailplane

Span: 53"      Airfoil: GOE 795  
Weight: 16 oz.      Wingload: 11 oz./sq. ft.

Price: ARF kit \$145.00 + \$10.00 S&H

For info, call or send \$1.00 for full catalog

**ICARE Sailplanes**  
381 Joseph-Huet  
Boucherville, Qc  
J4B 2C5 Canada  
(514) 449-9094  
(5:00-10:00pm EST)





# RAIDER

Unlimited Class Racer



Raider Racer Thermal Raider  
**\$419.95 \$439.95**

**Raider Racer**

Span: 96"  
 Aspect: 16:1  
 Aspect Ratio: 13.5  
 Surface Area: 100 sq. ft.  
 Wing Loading: 14-15oz. sq. ft.

**Thermal Raider**

Span: 101"  
 Aspect: 10:1  
 Aspect Ratio: 12.5  
 Surface Area: 87.9 sq. ft.  
 Wing Loading: 10-11oz. sq. ft.

**A Highly Prefabricated Plane Requiring Little Assembly**

**FEATURES**

- ▶ High Quality Molded Epoxy/Fiberglass/Kevlar Fuselage With Slip On Nose Cone
- ▶ Vacuum-Bagged RG-15 Composite Wings Featuring Blue Foam Cores Skinned With Carbon Fiber And Glass
- ▶ Pre-cut And Hinged Ailerons And Flaps
- ▶ Servo Bays Pre-Cut
- ▶ Bolt-On Modular Tail Surfaces With Bagged Glass Slab
- ▶ Optional 1000 mah Battery Pack And Replacement Parts

## CLIMMAX

High Performance 60" Span Hand Launch Thermal Glider

Now Available With Fiberglass/Kevlar Fuselage

Kit Price \$59.95  
 Pre-Fab Price \$159.95  
 Fiberglass Kit \$99.95  
 Pre-Fab FG Price \$169.95

**SPECIFICATIONS**

- Airfoil: BD-7037
- Wing Area: 400 sq. in.
- Wing Loading: 5.0-6.0 oz. per sq. ft.
- Two Channel: Rudder, Elevator
- Flying Weight: 12-14.5 oz. (FG)
- Machine Cut Balsa, Spruce, And Plywood
- Quality Feather-Edge Foam Wing Cores
- Flying Weight: 14-16 oz. (gl-wood39)

**High Performance CR Aircraft Sailplanes**

California Residents Tax 7.75%  
 Shipping & Handling \$9.00

VISA MasterCard

Prices Subject to Change Without Notice  
 Orders Shipped U.S.A.

C.R. Aircraft Models • 205 Camille Way • Vista • CA • 92083 • 619 / 630-8775

The Raider is the latest soaring masterpiece from designer Charlie Richardson. This plane is a direct and more potent descendant of the incredibly successful and blazingly fast "Renegade" slope racer. Charlie has succeeded in designing a multi-purpose Unlimited Class Slope Racer or Thermal Duration plane that has an outrageous L/D, fast acceleration, hands-off high speed stability, agile turning ability, and a super strong structure.

Everything on the Raider has been optimized for fast acceleration, high energy turning, thermaling, mid-air survivability, and fast ballast adjustment.

The Raider's modular design allows for plug-in replacement of any damaged parts. Flaps come down a full 90 degrees so it can be landed in small areas with high wing loadings. For those who don't need to wipe out the competition, the Raider is the best big speed machine around and just loves to speck out in thermals.

The Thermal Raider has more span, area, and aspect ratio than the Racer version. Even with such a light wing loading the Thermal Raider retains the fantastic speed range and crisp handling of the Racer.

The Climmax is designed for Hand Launch Thermal Competition and slope and thermal sport flying. The outstanding SD-7037 airfoil has been modified to prevent tip stalling and enhance upwind penetration in breezy conditions. Its clean aerodynamic profile allows for maximum altitude hand launches and it's high-aspect ratio flying rudder gives Climmax the ability to make tight, flat turns in small thermals. Climmax is also excellent for minimum-lift slope sites where only the lightest planes will stay aloft.

An outstanding speed range and tight turning ability make Climmax a fun choice for light lift slope aerobatics such as snap rolls and loops.

The new fiberglass/kevlar body gives the competition pilot the ultimate edge in handlaunch thermaling performance and dead-air glide ratio.

C.R. Aircraft offers a full range of sailplane parts, services, and accessories. Call for information and price quotes.

High Quality CA's and Epoxies  
 Full Line Of Batteries  
 Replacement And Custom Wing Cores  
 Foam Cutting Supplies  
 Servos, Wing Rods, Hardware

## 60" Span Class Slope Racer



ARF Kit \$269.95

**RENEGADE**

Renegade sweeps 60" Class and gets SECOND Overall in Unlimited Class Slope Racing At '83 Torrey Pines Speed Week

The Contender is designed for those who desire the ultimate in speed and aerobatics, featuring three channel control with wingrons, elevator, and full flying rudder. Contender's long tail moment and stabilizer design give it hands-off stability even at extreme speeds. The airfoil and wing design allows for an incredible speed range with the ability to turn or climb sharply with unmatched energy retention. Wings are constructed with blue foam cores, Carbon Fiber, and plywood wing skins and spars. The fuselage is designed with a large ballast compartment over the C.G. where up to 20 ounces of ballast can be placed for high lift conditions or slope racing. At the standard flying weight of 50 ounces, the Contender is very fast and will fly great in winds averaging as low as 5-7 m.p.h.

**SPECIFICATIONS**

- High Speed 2 Meter Aerobatic Slope Plane
- Transition Modified S3015 Airfoil
- Wing Area 420 sq. inches
- Flying Weight (unballasted) 50 ounces
- Wing Loading 17.0 to 24.0 oz. per sq. ft.
- Three Channel: Wingrons, Rudder, Elevator

**FEATURES**

- Machine Cut Balsa, Spruce, And Plywood
- Quality Blue Foam Cores And Carbon Fiber
- Wingron Linkages And Control Cables
- Hardened Steel Wing Root
- Complete Hardware Package
- Titled Plans And Detailed Instructions

The Renegade kit has all of the high performance flying ability of the composite version but at a lower price. Each kit features precision cut foam cores, full hardware kit, full size plans, and can fit any type of radio gear. The Renegade is one of the most versatile slope planes anywhere and can be built very light to accommodate those small slopes or thermal flying areas.

**FEATURES**

- Airfoil: S-3014
- Wing Area: 350 sq. in.
- Flying Weight: 25-32 oz. (unballasted)
- Two Channel: Ailerons / Flapron/Elevator
- Bolt On Wing - Foam Wing Cores
- Pre-cut Wood Parts
- Hardware Kit - Full Size Plans
- Standard Or Micro RC Compatible

**High Performance CR Aircraft Sailplanes**

California Residents Tax 7.75%  
 Shipping & Handling \$9.00

VISA MasterCard

Prices Subject to Change Without Notice  
 Orders Shipped U.S.A.

C.R. Aircraft Models • 205 Camille Way • Vista • CA • 92083 • 619 / 630-8775

The Renegade is the new "Bad Boy" on the Slopes of California, winning everything in the new 60" span racing class. The RG-15 airfoil gives the Renegade a blistering speed range and the ability to carry a massive ballast load if needed. Its flapron system cranks the plane through high-G pylon turns with little energy loss. Don't let Renegade's bad attitude scare you off because it is very stable at all speeds and has remarkable light lift and thermaling ability. This rugged plane gives you big plane speed at a small plane price.

**HIGHLY PREFABRICATED REQUIRING LITTLE ASSEMBLY**

- ▶ High Quality Molded Epoxy/Fiberglass/Kevlar Fuselage With Slip On Nose Cone - Installed Elevator Cable
- ▶ Vacuum-Bagged RG-15 Composite Wings Featuring Blue Foam Cores Skinned With Carbon Fiber And Glass
- ▶ Pre-cut And Hinged Ailerons
- ▶ Bolt-On Wing And Tail Surfaces - Optional Ballast Kit

## The Ultimate Aerobatic Speed Machine



Fiberglass/Kevlar Body Now Available!

### CONTENDER

Wood Kit \$109.95  
 Glass Body Kit \$169.95 • Composite ARF \$289.95



Wood Kit \$65.95  
 Pre-Fab \$159.95

### RENEGADE THE KIT

C.R. Aircraft Models • 205 Camille Way • Vista • CA • 92083 • 619 / 630-8775