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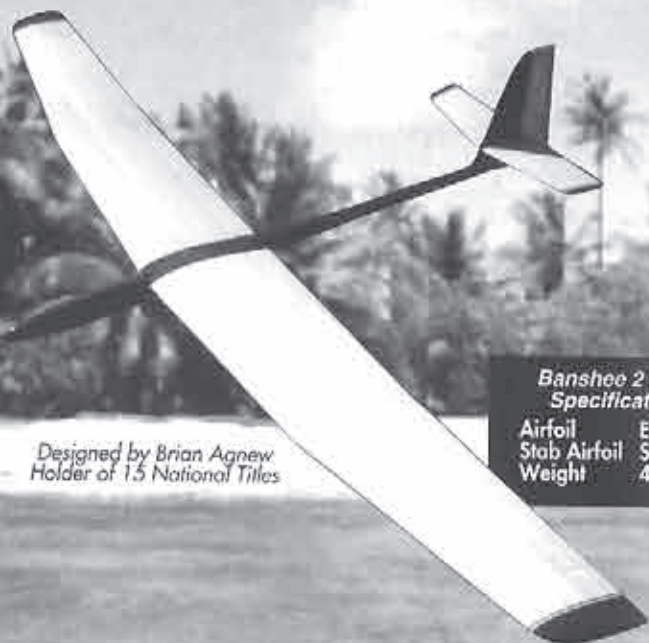
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September, 1997

Vol. 14, No. 9

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A Publication for the
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AUSTRIA ELEPHANT

Photo taken at Los Banos '97, courtesy of Robin Lehman, New York City, New York.

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ZIKA 

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The Soaring Site

What's New?

Well first, Jim and Peggy Gray asked us to let you know that they have an e-mail address, now, and can be reached at <jimpeg@netzone.com>. For those of you relatively new to these pages, Jim created RCSD back in January, 1984; he loves sailplanes and is a ham radio operator, as well as trying his hand at anything else that comes along that strikes his fancy. Archery, for example!

Someone that also needs little introduction, Gordy Stahl, Traveling Reporter, is now a columnist for RCSD. This guy really gets around. So, if you want him to stop in, next time he's in your neck of the woods, drop him an e-mail at <GordySoar@aol.com>.

No, e-mail is not the only way to reach folks; but, it is fast becoming the easiest. A lot of folks take their laptops with them, wherever they go, so it's the quickest way to track down folks that are frequently on the road. And, our thanks to all of you for the speed at which our requests or messages are returned!

And speaking of busy, both Fred and Steve will be gone from these pages for awhile longer. In Steve's case, he's making up for all the long hours and overtime he put in working for the Coast Guard over the years. Now that he's retired, he's taking in the sites with his wife, Vicky, that he's missed over the years. And now, he says, "I'm going to need a vacation from retirement!" Ah, well, isn't that the way it goes?

This month, Martin's back to tell us about the Championships in France, which he did, indeed, attend. And, Lee Murray is reporting on two retirement locations. Lee's still looking for input, folks, so please drop him a note or give him a call, if you know of any places that you think fit the 'bill'.

Happy Flying!
Judy & Jerry Slates

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How to Minimize Tipstall Potential

For Large R/C Scale Gliders

...by Joe Enhuei
Laurenceville, New Jersey

Large R/C scale gliders, just like their full-sized counterparts, are known to tipstall, and are difficult to recover if not flown properly. This is caused by insufficient airspeed and/or excessive turbulence flowing through the high aspect ratio wings. I have noted that tipstall is one of the common causes of crashes during the landing pattern. After several years of flying large R/C scale gliders of various design and size, I found that there are a few ways to minimize undesirable tipstall.

1) Balance the model at its design C.G., or slightly nose heavy, as it is difficult to fly and land a tail-heavy scale glider. It should be noted that a large glider should not be treated as a competition glider.

2) Make sure that the wings and stabilizer are set at the design incidence angles. Otherwise, a scale glider will not fly and turn efficiently.

3) Make sure that the control surface linkages are positive. An elevator linkage with excessive play can cause ballooning, which may lead to a stall.

4) Winglets can minimize the vortex development at the wing tips, give ailerons more authority at lower air speed and, thus, increase the margin of safety against tipstall.

5) Ballast the model, especially if

flying in windy conditions. A ballasted model tends to fly faster and will be less prone to wind gust induced stall.

6) Use aileron differential (more up, less down) to minimize adverse yaw potential. Severe adverse yaw may lead to tipstall.

7) Coordinate turn with ailerons and rudder. An uncoordinated turn may result in sideslip/skid, and lead to tipstall. Intentional sideslip to bleed off altitude is another subject.

8) Trim one or two clicks of down elevator, in order to slightly increase flying speed in the landing pattern.

9) Deflect both ailerons up slightly, if the ailerons run on separate channels, to create wing tip washout; this will lower the stall speed.

10) Be gentle with the controls; do not make sharp turns when flying low for landing.

11) Mix down flaps (if the model has them) with down elevator, in order to maintain air speed in the landing pattern.

12) Do not deploy spoilers during base leg and final turns, because this could make a coordinated turn difficult. Deploy spoilers to bleed off altitude prior to landing pattern and during final approach upon touchdown.

13) Stay cool! Keep the model from flying too slow, pitching up, and landing sideways in the landing pattern.

It is quite easy to fly and land a large scale glider; if it is trimmed and flown properly, your model will reward you with many hours of scale soaring. ■

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Building a 2 Channel Polyhedral Glider - Part III

This month, we'll discuss how to fit the wings of the polyhedral glider on the fuselage. Earlier, when the foam core wings were constructed, 2 sets of plywood root ribs were required, but I prepared 3 sets, instead. The third set was set aside, until now. This set was used as a template, in order to properly mark and drill the holes for the wing rods. As shown in photograph 1, the wing rods have already been installed in the fuselage.

Using this template a second time, holes were drilled in a piece of 1/8" plywood; as shown in photograph 2, the plywood was fitted onto the installed wing rods and fuselage. Slipping the wings in place, I traced the wing profile onto the plywood, as shown in photograph 3. Then, the new root ribs were cut out, and glued in place, as shown in photograph 4. Using automotive body filler, I back filled around the new root ribs, and sanded smooth. (See photograph 5.)

The fuselage was primed as shown in photograph 6, and painted, as shown in photograph 7.

The rudder (photograph 8) and stabilizer (photograph 9) were the only parts built off the original plans.

The last photo shows the completed model. With its 101" wing span, the model has a gross weight of 51 oz., and a wing loading of 9 oz./sq. ft.

On its first flight, we logged in 17.5 minutes, which is pretty good, although I went a bit too long on the downwind leg, having to walk a bit to retrieve the plane.

You might ask, "Was it fun flying a 2 channel, polyhedral, again?" And, of course, I'd respond with an emphatic, "Yes! I've taken a step back in time and really enjoy flying the new model!" ■

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#1 - Wing rods installed into fuselage.



#2 - Plywood fitted onto wing rods.



#3 - Wing profile traced onto plywood.



#4 - New root rib cut out and glued in place.



#5 - Root rib back filled, using automotive body filler and sanded smooth.



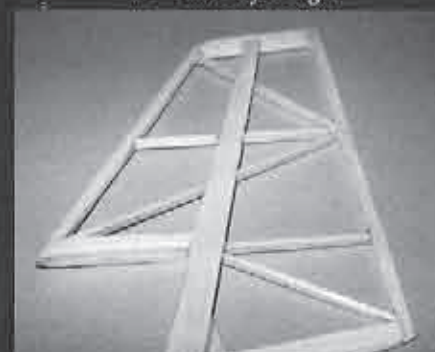
#9 - Stabilizer. R/C Soaring Digest



#6 - Fuselage primed.



#7 - Painted fuselage.



#8 - Rudder.



#10 - Completed model.

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1/3 Pribek ASW 27 - 5 meter span (196"), wing profile HQ 2.5/12, ca. 20 lbs.

1/3 Müller Discus - 5 meter span (196"), wing profile HQ 2/12, ca. 20 lbs.

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1/4 Roedel Piper Super Cub (scale towplane) - 2.687 meter span (105"), wing profile Clark Y mod., approx. 15 lbs. This airplane is partially built. It requires additional building and covering. Suitable motors are OS 160 T, OS BGX-1, Brison 3.2, or similar.

1/4 EMS DG 800 with electric pop-up motor installed - 3.7 (145") to 4.2 (165") meter span, wing profile HQ 2.5/14, ca. 7.5 lbs.

1/2.77 Pribek ASW 19 - 5.4 meter span (212"), wing profile Ritz 3 mod., ca. 20 lbs.

1/3 ASK 13 - 5.33 meter span (209"), wing profile E 68-67-66, ca. 32 lbs. Completely built & ready to fly with all servos installed, brand new, unfown.

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September 1997

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Northrop Grumman B-2 "Spirit"

We are always requesting readers send in suggestions for topics for future columns, and several have asked about various aspects of the B-2 Stealth Bomber, now named "Spirit."

A query about the feasibility of building a scale model of the B-2, without an active flight control system, showed up a short while ago on one of the internet e-mail groups, Doug Bullard's Nurflugel list. Al Bowers' reply to the question was fascinating, not only because it disproves the general consensus about the B-2 pitch stability, but because of the methods Al

employed to reach a conclusion. Here's a portion of Al's response:

"At the time of the roll-out down in Palmdale, *Aviation Week & Space Technology* ran some rather nice photos. I was still sitting in the same office with my mentor, Alex Sim. Alex and I were chatting about the B-2, and we could not decide if the aircraft were statically stable or statically unstable. Alex said the B-2 was stable, and I said it was unstable. (Remember that the X-29 was still flying here at Dryden, and I was greatly enamored with unstable aircraft at the time.)

"Based on the photographs, we made a simple vortex-lattice model and estimated the CG position on the location of the main gear. (Typically, the CG is about 15 degrees forward of the main gear for rotation at takeoff.) I

made the model (based on published photos), and ran the code. The B-2 is stable."

We were able to see the B-2 at relatively close range a few years ago, when one was flown into Boeing Field in Seattle. "Spirit of Washington" had its picture on the front of nearly all of the local papers, and literally thousands of people came out to see it in person at the Museum of Flight. The "Spirit of Washington" is truly a beautiful airplane, and is one of those currently at Whiteman AFB, Missouri.

Our photographs of the "Spirit" were limited in scope, because of the curtailed number and scope of viewing sites. Still, we were able to obtain pictures of some aircraft details, and a few of our own questions about the B-2 were answered by simply being able to view the airplane first hand.

	YB-49	B-2 "Spirit"
Span	172 ft.	172 ft.
Area	4,000 sq. ft.	5,140 sq. ft.
Engines	Eight J35-A-5 4,000 lbs. thrust each	Four GE F118-GE-100 19,000 lbs. thrust each
Weight, empty	88,100 lbs.	153,700
Weight, gross	213,000 lbs.	398,500
Speed, max.	520 mph	high subsonic
Service ceiling	42,000 ft.	50,000 ft. with terrain following
Range	4,450 miles	8,000 miles without refueling
Payload	36,700 lbs. for 1,150 miles	more than 40,000 lbs.
Crew, min.	3, 5, or 7, depending on mission	2 or 3, depending on mission
Computers	none	more than 150

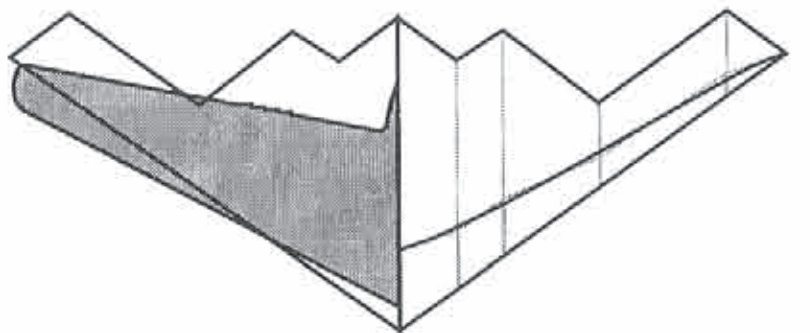
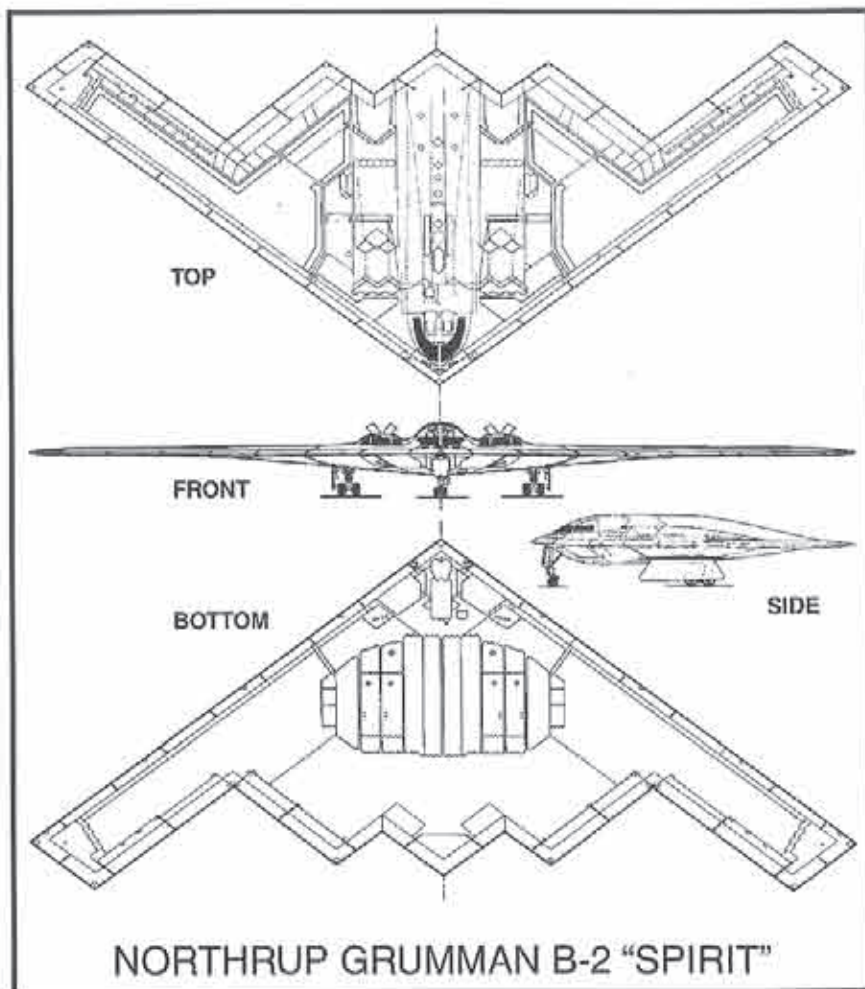
- There is a bit of twist in the outer panel of the B-2 "Spirit" wing. Since the trailing edge and leading edge of the wing actually meet at the tip, it is not easy to determine the actual amount of twist visually. However, by expanding the Air Force provided 4-view, we found it to be around two degrees.

- The wing has a very sharp leading edge, and a pronounced "droop", in the area of the fuselage — from the center line to outboard of the engine nacelles.

- The wing surface is smooth, with no creases, despite the sharp angles in the trailing edge. All of the control surfaces, on the other hand, are made from flat plates. The front view is very reminiscent of the Northrop N1M, with the lower surface of the wing forming a very wide belly.

- The B-2 has an odd shape as seen from overhead, but plotting the wing quarter chord line gave us quite a surprise. We drew up the planform of one wing and marked the chords at all of the trailing edge discontinuities. We found all of the quarter chord points, then connected them all with straight lines. Finally, we connected the midpoint of each of those line segments and used the smoothing function in our graphics program. The result is a surprisingly straight curve, which arcs slightly backward initially, then forward near the wing tip. We've reproduced our graphical exercise in the included figure. That same figure contrasts the





NORTHROP GRUMMAN B-2 "SPIRIT" AND NORTHROP YB-49

NORTHROP GRUMMAN B-2 "SPIRIT" SMOOTHED QUARTER CHORD LINE

overhead view of the B-2 and the YB-49. Specifications for the B-2 (and the YB-49) are shown in the included Table. About the only similarity between the B-2 and the Northrop YB-49 is they share the same wing span — 172 ft. The progress which has taken place over the decades separating these two aircraft is remarkable.

As many of you have probably heard, the B-2 became fully operational on April 1st of 1997. We're not sure if April Fool's Day was an appropriate day or not, given the known performance of the B-2 versus the government's proclivity to abandon military projects involving tailless aircraft (YB-49, A-12 "Dorito", etc.). At present, thirteen aircraft are deployed at Whiteman Air Force Base; a total of 21 will be sited there by the end of 1998.

Several years ago, a large scale YB-49 was flown at the Slope Scale Fun-ly in Richland, Washington. What an exciting prospect to have a B-2 "Spirit" in the same scale! If any readers of "On the Wing..." have completed and successfully flown a model of the B-2, regardless of size, we'd very much appreciate hearing from you!

Ideas for future columns are always welcome. Send to "On the Wing...", Bill & Bunny Kuhlman, P.O. Box 975, Olalla, WA 98359-0975; or <bsquared@halcyon.com>.

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Jones, Lloyd S. *U.S. Bombers; B1 - B70*. Fallbrook California: Aero Publishers, Inc., 1966.

Northrop Grumman web site: <<http://www.northgrum.com>>

Nurflugel web site: <<http://www.nurflugel.com>>. (Information on subscribing to the Nurflugel e-mail list is on this site.)

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A Division of the Soaring Society of America



The purpose of the Sailplane Homebuilders

Association is to stimulate interest in full-size sailplane design and construction by homebuilders. To establish classes, standards, categories, where applicable. To disseminate information relating to construction techniques, materials, theory and related topics. To give recognition for noteworthy designs and accomplishments.

SHA publishes the monthly *Sailplane Builder* newsletter. Membership cost: \$15 U.S. Student (3rd Class Mail), \$21 U.S. Regular Membership (3rd Class Mail), \$30 U.S. Regular Membership (1st Class Mail), \$29 for All Other Countries (Surface Mail).

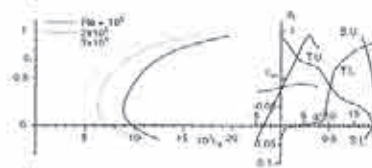
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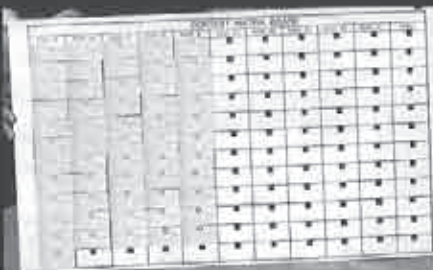
Combat Contest Logistics

After running three or four very successful contests at Laguna Niguel, our club feels we've zeroed in on some good methods for keeping things organized and moving, as well as keeping the CD's contest work load as light as possible. This month, I'll give you a look at a simple device to achieve total organization and run an event that yields meaningful scores to reward piloting skill.

The first ingredient for success is a good method of matricising rounds in a contest. Our club's standard contest format consists of two non-elimination rounds, with the highest scoring pilots advancing to a final championship round. After the first event run at our hill, I felt some sort of charting system was crucial to making the organization of the rounds and frequency control quick and effective. The Matrix Board was the answer! How's it work? Let's take a look.

The board is organized in vertical columns that each represent a heet designed to accommodate up to twelve pilots per heet and five heets to make up each round. We call the first two rounds the 'Mains' and the championship round the 'Final'. With five heets of twelve pilots each possible per round, our board can handle a contest of up to sixty pilots. The heets are labeled 'Main 1A', 'Main 1B', 'Main 1C', etc., and 'Main 2A', 'Main 2B', 'Main 2C', and so on. The last column is the Final round.

Each pilot has a card filled out at registration. The card displays the pilot's name, AMA number, primary and secondary channel numbers, as well as slots to record his or her scores for the first two rounds of competition,



Combat contest Matrix Board. Computer plot is adhered to 1/4 inch plywood backing. See text for description of functionality.



Detail of Matrix Board showing first round of five heets laid out and ready to run! It takes only minutes to get a contest organized and eliminate channel conflicts.

AMA: _____	o
PILOT: _____	
MAIN 1: _____	CHANNELS:
MAIN 2: _____	PRI. _____
MAINS TOTAL: _____	SEC. _____
FINAL: _____	

Sample matrix card. With a large enough board, even more information can be added to the card. It's also handy to have the cards after the event to organize and record contest statistics for posting in newsletters, magazines or on the internet.



Yours truly (seated) and Lynn Johansen with tape measure do technical inspection on Thomas Aker's bird at the '96 LNSSG Turkey Shoot. Notice scale, tape measure and box to store matrix cards at the ready to keep the line moving.



Bowman Hobbies' Ruffneck Javelin EPP Handlaunch Glider; one of a new generation of lightweight and durable sport HLG's.



Torque & Recoil Club's 'Bob'. Middle school styrene foam and ply construction are used to create a very light and strong performance HLG at a very reasonable price.

and a slot to fill in the total score of those two rounds. We lay out the cards on the board by basically 'drawing from a hat' to derive a random sprinkling of pilots. Frequency conflicts can be quickly identified and resolved by moving the cards around. A pilot can check his or her progress in the event, by simply looking at the board. After all the pilots have flown two rounds, the scores are totaled and the top eight to twelve scores are advanced to the Final round slot. Pretty slick, huh? This system works perfectly EVERY time, and the photos you see here show you a contest with 56 entries, that ran smooth and efficient from start to finish!

The break-off score for making the final round depends on the contest and conditions. Generally, there'll always be about five pilots with definitively high scores and a few behind them. The break-off score is determined by the CD to yield a final round of at least eight pilots and no more than twelve. The three highest scores in the Final round determine the top three places in the contest regardless of previous round scores. If there's a tie for any of the three top places, then the Main round scores are added to the final to break the tie. If that also yields a tie, then a fly-off between the tied pilots is conducted. First pilot to score a kill in the fly-off takes the trophy!

The biggest challenge was figuring out a simple way to keep the cards on the board. We eventually settled on using 1/2 inch squares of adhesive backed magnetic tape stuck to the board's grid squares, and steel washers placed over the cards to hold them in place.

This method works pretty well and is easy enough to use, but it's still vulnerable to being tormented by the wind. The next generation board will have transparent pockets to place the cards in that will make it completely wind proof.

At our club, we typically draw thirty entries, and the big, well-hyped events can draw numbers in the fifties. When pilots know they can go and be treated to a well organized event, they will come!

New Stuff

Foamies have broken into the handlaunch arena! Now you can own a plane that can truly be flown virtually anywhere; and I do mean anywhere! I frequently take a break from kit making, at a local park down the street from my house, by throwing a little handlaunch with my own 1-26 semi-scale foamie. This place is surrounded by trees and is rife with signs, concrete benches, drinking fountains and children's play equipment. No one in their right mind would fly one of today's high tech composite HLG's at this place. However, armed with the crash-proof characteristics of a foamie in the shape of a handlaunch airplane, the choice of potential flying sites is practically unlimited! Here's some new items that have filtered across your columnist's desk in the last few weeks.

Our first offering comes from Mr. EPP himself, Pat Bowman of Bowman's Hobbies in Saugus, California in the form of the Ruffneck Javelin. This little bird is a blend of combat technology and time proven methods, with its all EPP wing sporting a carbon spar and EPP pod fuselage mated to a carbon tube boom. Tail surfaces are sheet balsa, which Pat is comfortable with, since we all know what takes the heaviest beating on our HLG's. NOT the tail surfaces! Its 60 inch span, 30 inch length, and 420 square inches of area put it in the realm of common geometries for modern handlaunch aircraft. The airfoil is an interesting mix, too, with the top profile of an Eppler 374 joined with the bottom profile of a S7083. At 16 ounces ready to fly, it's certainly not in the weight zone of the competition planes, but its incredible durability makes it excellent for sport flying or keeping the arm in good condition for competitive launching practice. After throwing around a one pound plane for a little while, you'll feel like you can throw your little 11 ounce wonder-winner contest ship to the moon! It's designed to be a full-house, four servo ship, utilizing micro gear, and comes with hardware in the kit. For more information on the Javelin, contact Pat at 21069 Susan Carole Drive, Saugus, CA 91350. Call at (805) 296-2952 or E-mail to

Ruffneck1@aol.com. Considering its advanced design and materials, at \$79.95 + \$7.00 s/h it's a real bargain. Looks like another winner for Pat.

And, after a long wait for new toys from Joe Galletti of the Torque & Recoil Club, he brings us Bob. That's right; just Bob. Not 'the' Bob or 'a' Bob... Just Bob. (Joe made this very clear to me on the phone.) Joe has made a stride in foamie development in regards to using his own unique construction methods, utilizing blue foam and 1/64 inch ply to create an HLG with advanced geometry and high performance. Many of its components were based on models already being marketed in the high performance handlaunch world (with those maker's permission), such as the basic wing planform and moments derived from the Airworks Epsilon, and the tail group closely paralleling the Zephyr. The airfoil is Joe's own proprietary section. The polyhedral wings are covered with thin packing tape or Econokote and yield a plane with an overall weight of only 10.2 ounces for a 4.25 ounce per square foot loading! This weight figure accounts for a pair of HS-80 servos, a Hitec micro receiver in its case and a 270 mah battery pack; not too shabby, eh? Bob can also be built as a wingeron setup, and the aileron version will be released later this year. Bob is selling for \$55.00 + \$8.00 s/h. Get hold of Joe at 7004 Chinook, Austin, TX 78736, (512) 454-0061, or you can E-mail to Foameron@aol.com. It's nice to see another example of Joe's unique vision; in his words, "Foam planes are the way!"

Reader's Ride

Fred Guilfoyle of Edmonds, Washington gets it again this month! Here's his latest creation.

Meet the double size Floyd! That's right; it's a 96" span version of the venerable Pink Floyd combatter. As Fred says, "It's big, it's ugly, but it's FUN... That's what it's all about." It weighs in at an incredible 8 pounds, but Fred says, "It flies like a dream." Check out the transmitter laying against the wing. Looks like a shrunken head! Mostly constructed of blue foam, also visible is the exotic EPP



Fred Guilfoyle's HUGE Floyd! At 96" span and 8 pounds, where does this foam giant fly? Anywhere it wants!

nose block and carbon cloth spar cap. Say, you don't think it's some kind of protest or something, do ya? Protest or not, our thanks go to Fred for this fine and fitting submission to FF&HL.

Back to the Fray

So, that's all for this month. Keep 'em high and tight, and stay frosty. You never know where the next kill may be! See ya' in a couple months. ■

Our apology to reader, Scott Hewett. In the July issue of RCSD, page 20, the caption, for the center photo, says, "Birdworks Zipper meets foame 109." Scott says that the plane is actually his homebrew "Sloth", and not a Zipper. My apology to The Birdworks, as well, for confusing the "Sloth" with the "Zipper". July ■

News Release

Ed Whyte of Whyte Wings has announced the acquisition of the Airtronics Specialty Division (ASD) kit line. The current kits include Sapphire, Gem, Thermal Eagle, Falcon 600, and numerous accessory items relating to the sailplanes. For additional information, contact: Whyte Wings, 1578 Osage St., San Marcos, CA 92069; (760) 744-1553. ■

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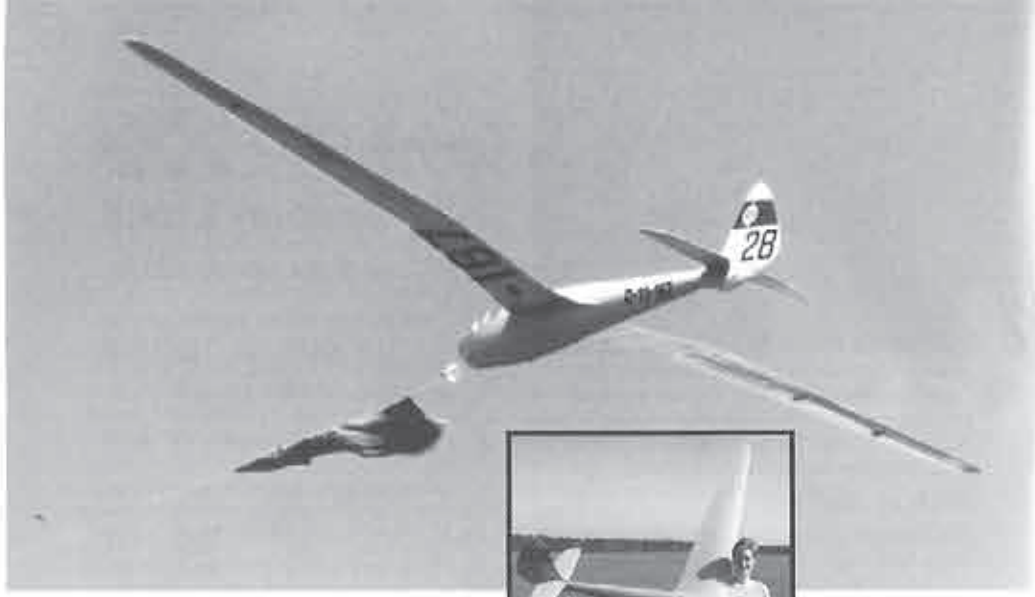
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Keep it simple!

First flights are always interesting experiences to say the least, and sometimes can be quite traumatic! Is the C of G in the right place? Is the stab where it should be? Are the incidences correct? Do you have the proper throws on the control surfaces? And how will the thing fly? All of this adds up to sticky palm time on the first flight!

Especially with the modern scale sailplanes, there are a lot of variables. A few fly with flaperons, but there are many with flaps, as well as the other standard controls (ailerons, rudder, elevator, spoiler, retracts and nose release).

I've seen a few first flights with the sailplane set up for "crow", flaperons, drooping ailerons, coupled elevator and flaps, coupled rudder and ailerons and flaps, etc., etc., etc. Our fancy, contemporary, state-of-the-art digital radios now allow us to combine many flight functions on a single stick or switch. This isn't always a good idea.

Might I suggest that, on your very first flight, you keep it simple? Do not couple ailerons with flaps or elevator; leave all the controls working independently. On your first flight it might be helpful to find out how well the airplane flies, and on subsequent early flights to be able to ascertain exactly what the flaps do (Do they make the nose pitch up?), and what the spoilers do (Do they make the nose pitch down?). Do you have enough elevator

control? (Flaps can affect elevator, so leave them alone to find this out.) Should you couple ailerons and rudder? (If you haven't flown the airplane before, you don't know how much of each is required to initiate the best possible turn.) How effective are the ailerons when flying in crow position, etc.? I'm sure you get the idea.

Some of the full sized aircraft do mix ailerons with flaps (the ASW 27, for example), and some use flaperons (the DG 600), and so it is very seductive to immediately want to fly one of these birds set up just like its big sister ship. However, if something is not quite right, and the model does not perform perfectly on its first flight, you will have a hard time figuring out exactly where the problem lies if you have too many of these controls coupled or mixed together. That's why I strongly recommend that you keep it simple.

Once your scale ship flies perfectly and is balanced correctly, then experiment as you wish. If you change one thing at a time, once you know how it flies, you will be able to accurately evaluate the effect of each new configuration or coupling you plan to try. For example, sometimes it takes me five or six flights to get the correct amount of up elevator coupled with spoilers (if needed) on a particular aircraft. The Rödelsmodell ASK 21 has extremely effective spoilers which, when fully deployed, will pitch the nose of the aircraft down at quite a steep angle. So it's very handy to mix in a bit of up elevator. On the other hand, the Roke ASK 18 needs hardly any



elevator when you deploy the spoilers, as this model will float right in.

The moral of the story is that each scale sailplane will fly slightly differently; you have to experiment in order to get the best out of your model. If you change only one thing at a time, in just a few flights you will get to know your bird and be able to get the most out of it.

Fred Rettig's Reiher

In March of this year, at an event in Pensacola, Florida, I saw Fred Rettig fly his 1/4 Reiher; it's a very gentle bird, and thermals as well as anything! It's very slow and realistic in the air, performing exactly as a vintage bird of its size should! Incidentally, the gray color scheme shows up very well when very high in the sky.

Good luck and good flying! ■



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Jim Swinnich with Skyrider. Photo courtesy of Martin Simons.

Radio Controlled Sailplane Model Exhibit & Seminar

...by John Derstine Gillett, Pennsylvania

On Saturday, the third of May, held in conjunction with the U.S. Soaring Hall of Fame Induction Ceremony, and the dedication of a full scale flying wing exhibit, the National Soaring Museum presented two programs of significant interest to R/C soaring pilots. The first was the dedication of an exhibit displaying the progress of R/C soaring from 1937 to the present. The exhibit included three examples of R/C sailplanes dating back to 1938. The first of these planes was the Skyrider, developed from the work of Ross Hull, and flown successfully at the 1938 full scale soaring nationals at Harris Hill. This plane is an enormous presence in the museum. At 16' wing tip to wing tip, and weighing over 30 pounds, it vies for space with many of the full scale ships on display. The fact that it is still in one piece after flying with single channel escapement driven rudder only control, is remarkable in itself. Its

appearance is not unlike that of a bulky 1/3 size Minimoa. The second plane in the display, is Mark Smith's prototype Windfree. On loan from Dr. Larry and Gary Fogel of San Diego, California, it is the very same Windfree that Mark won many contests with in the 1970's. This model represents the early years of what I suppose is considered the modern era of R/C soaring. It is positively dwarfed by the Skyrider, and looks like a small hand chucker by comparison. The final model in this chronological trifecta, is the Skyhawk, a 1995 Mark Allen Design. Donated by Ed Slegers, the Skyhawk is typical of modern Thermal Duration design, and is in fact a winner of many regional contests. The Skyhawk demonstrates the technological advances in R/C sailplane design in recent years (i.e., multi-function control surfaces, composite construction, and computer radio technology). Underneath this historical "gaggle", on the floor of the museum, lies a kiosk, with a hands-on interactive display. This demonstrates how control surfaces are deflected on an R/C sailplane by the movement of a transmitter control stick. This display, with working mock up of a model sailplane complete with ailerons, elevator, and rudder, is controlled by an actual JR 622 computer radio. The transmitter has been converted to use DC current and uses a DSC cable to send a signal to the model. Members of the local Harris Hill L/D R/C club helped construct this presentation. Horizon Hobbies donated the radio, and helped also with technical advice.

The opening of this exhibit was also accompanied by a flight demonstration in the morning, and a symposium on R/C flying, in the afternoon. Unfortunately, the weather did not cooperate, and the flying did not take place due to 30 mile per hour winds, rain, and hail. (Just a minor impediment to flying.)

We ended up bringing some of the planes inside and setting up a static display, along with some soaring memorabilia. The ARRL also had a table set up with some antique radio equipment from the days of the Skyrider. This really made us appreciative of what we have today in the way of miniature equipment. The symposium was a great success, and many

speakers commented on R/C flying from the days of Ross Hull to the present.

Speakers of note were: William Thompson and Alvin Battison, who spoke for the ARRL (American Radio Relay League) on the early history of radio control. Gary Fogel spoke on the history of R/C soaring, and told a little about each sailplane in the exhibit. Dr. Larry Fogel gave an entertaining talk on full-scale vs. scale R/C modeling. Bill Gallagher, a full scale pilot and Editor of the NSM historical journal, spoke on the history of full scale soaring flight. Maynard Hill, past president of the AMA and holder of 22 world records for R/C aircraft, presented a talk on record setting R/C flights. Martin Simons, who needs no introduction in these pages, spoke on the aspects of scale documentation, and how better to get accurate three views for model construction. Larry Sanderson, president of the Soaring Society of America, wrapped it up with a talk about how full scale soaring and modeling can cooperate.

The gathering was an intimate one with about fifty in attendance. This

was a plus for those who could be there, as it was more like having a conversation than attending a seminar. Indeed, it was possible to talk at length with any one of the presenters throughout the morning, since the weather didn't permit the flying demo.

The model exhibit and seminar were the brain child of Paul Schweizer, who at seventy something has the youthful exuberance, and enthusiasm of a person half his age. Thanks should also go to Jim Swinnich, executive director of the NSM, and to the rest of the staff of the Museum, for putting this together for R/C pilots and enthusiasts to enjoy when they visit the National Soaring Museum.

This event, while small, served, in my opinion, to rekindle the relationship between full scale soaring and R/C soaring. Oddly enough, some modelers, such as myself, started out in full scale and drifted towards modeling, and many full scale glider pilots started out with models as children. These are not separate activities, but merely separate branches on the same tree.

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Feedback from Readers

Flying Into Retirement

Reported by Lee Murray
Appleton, Wisconsin

In the June issue of *RCSO*, I posed an open question about where the best place to retire might be. I indicated that Bob Johnson had suggested Muncie, Indiana, while Dave Beck (Mr. Solar Power) had suggested southwest Arizona, because of the high level of direct sunlight and low housing costs. A list of favorable attributes was given. Two readers responded with e-mail about the places they presently live, and recommended their locations as the ideal retirement location for serious glider modelers/flyers.

Jim Allen, President of the Las Vegas Soaring Club, Inc., suggests that I include Las Vegas in a list of possible places to retire. He says, "It meets all your criteria to a 'T'. Great weather, usually only 4 inches or so of rain a year. Our thermal site is 1,000 x 2,000 feet, about a mile off a freeway, and less than 20 minutes from the retirement community of Sun City. In the last two years, our club has doubled in size and, interestingly enough, almost all of the new members are retirees. Taxes are very reasonable. The only problem we have had is slope soaring. However, with the new EPP planes, our problem may have been solved!! (There are only rocks on top of the hills here!) Full sized soaring site is available at Jean, Nevada, about 45 miles from our model site. We also have several airfields for power pilots, one of which has hosted the TOC, and our dry lake bed that hosts the Quarter Scale meet every year. For me, this is the 'ideal community'."

Martin Usher, Thousand Oaks, California, spoke highly of his present location as a good place to retire. Martin says that, although there's no such thing as an ideal community, he lives in one which is about as glider friendly as it could be.

"Thousand Oaks, California is about 45 miles northwest of Los Angeles. Although the area - in the Conejo Valley - is adjacent to LA, it has a very different character. One of the most notable differences is that the crime

rate in TO and Simi Valley (an adjacent city to the north) consistently are the top contenders for the lowest crime rate cities, according to annual FBI statistics.

"The climate is coastal Southern California. Basically, it's rarely very hot, very cold, very damp, or very dry. Sort of air conditioned. The usual wind direction is from the west, particularly in the afternoons. From a gliding perspective, a typical day starts out flat, and builds in thermals from about 9 a.m. to lunch time; then, there's enough breeze to slope, on the numerous hills in and around the city, for the afternoon, giving out about 5 p.m. The weather's pretty consistent - you can probably fly 320 days or more a year. (It rarely rains between March and late November, you see, and when it does rain it doesn't stay socked in for days or weeks at a time.)

"Thousand Oaks is a planned community of about 109,000 people. Approximately one third of the land is open space. The council doesn't mind you flying on it (the open spaces), but a lot of it is difficult to get to. There are several official sites to fly from in the area; the one we (Thousand Oaks Soaring Society) use is a school playing field - very convenient, but we've got to be careful not to bomb the neighbors too much! One of the best flying clubs is a few miles to the north; they've leased 5000 acres of open land and have a strip big enough to aerotow from.

"I maintain some Web pages for TOSS at: <http://pages.webdiggy.com/PFBX52A/toss.htm>

"All in all, a pretty ideal place to live. What's the catch? Guess... Housing is a bit expensive, of course. However, there are a number of outlying communities, such as Fillmore, which are not very convenient to commute from, but not a problem if you are retired. These outlying communities are largely agricultural, and housing prices are much more reasonable. There are other areas inland, which are similarly favored for retirement, because of cost; but, of course, the further inland you get the more continental the climate gets.

Wherever you live, there's no shortage of places to fly - while it's true that some nice places are private and you can't go to them, there's no question of having to drive an hour or more to launch; try 5

to 15 minutes or, if you really get well placed, off the end of your back yard."

Housing

A check of housing costs was done through the Internet for a 1200-1800 sq. ft., 3 br. house, with 2 baths. Las Vegas housing ran \$105 to \$120 thousand. Similar, existing housing in Thousand Oaks lists for \$145 to \$175 thousand. There seem to be larger lots with the Thousand Oaks properties.

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.

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Jack Dusseau on final approach to "shag" runway.



"...And this, Gentleman, is the Kryptonite I used for ballast!"



Las Vegas Soaring Club

...by Jim Cook
...Photography by Cindy Cook © copyright 1997
Livingston, Texas

Las Vegas! What a town, with great weather, friendly soaring club, and enormous flying field. Rumor has it that there are other forms of entertainment in the area.

My wife, Cindy, and I are traveling around the country in our RV. Whenever possible, we fly our Olympic 650 at local flying fields. We were welcomed to Las Vegas' club field by their president, Jim Allen.

The club members fly in a drainage basin. Yup, drainage basin. Doesn't that sound awful? It's really a wonderful site. I estimated it to be roughly 2000 feet by 1000 feet, and flat as a poker chip. The basin was constructed when the city dug this enormous hole in order to contain rain runoff. It, in the future, there is a climate change of biblical proportions, and Las Vegas' average rainfall increases from its existing 5 inches per year to say 100

inches per year, then this drainage basin will certainly come in handy. In the meantime, this club has a flat, dry place to fly.

The designated landing area is a piece of carpet with a bull's eye painted on it. The guys with full-house planes were able to nail it time after time. The rest of us just landed wherever we could. It was great not

having to dodge trees, rocks, moose, or other obstacles.

We were there in March, and it was a balmy 95°, which is quite comfortable if you're a lizard. These guys must get thermals 12 months out of the year.

Jack Dusseau was kind enough to provide some flying instruction for my wife. Everything went well until an updraft caught our Oly and started to carry him away into the wild blue yonder. Jack stepped in and saved the day for her.

Tibor Martin entertained us with numerous flying stories and helpful hints.

On our second visit to the field, we

R/C Soaring Digest

watched a club contest. All the club members present seemed to be engaged in some useful activity: scorer, timer, retrieving winch line, piloting, or heckling.

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Jim Allen grabbed first place, Geary Keilman placed second, and Don Gintliner came in third. It was obvious that these guys were not new at this game. Jack Dusseau was doing well, until a control surface parted company during launch.

We would like to thank this club for their hospitality, and for letting us share this great facility. We will continue traveling around the country, searching for places to fly the friendly skies. ■



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25th World Gliding Championships

...by Martin Simons
Stepney So., Australia

As planned, I attended the full-size, 25th World Gliding Championships at St. Auban in France. The event ran from 29th June 'til 13th July.

To describe in detail every day's flying would require several years of *RCSD*. I thought, however, that *RCSD* readers would be interested in the sailplanes that were flying in the contest and a little about the newest developments.

The championship pilots have definitely made up their minds about winglets. Despite the additional cost of several thousands of dollars, of the 74 sailplanes entered in the Standard Class and Fifteen Metre classes, only 8 were without winglets. In the most expensive Open Class, with spans exceeding 26 metres (85 ft.) sometimes, and very high aspect ratios, the wing tip vortex drag is already reduced almost as much as possible. Even so, five of the 18 'big ships' had winglets and 9 had very carefully shaped wing tips with additional dihedral over the outermost metres of the wing and, as a rule, some slight sweep back to give a mild form of crescent shaped tip. Such outer wings might be described as 'Nimbus' tips, but the ASW 22 flown by Uli Schwenk followed this trend, too. Only one of these enormous sailplanes had the old form of turned down tip, to provide a rubbing block when touching a tip on the ground. The other three had simple, slightly upswept Horner tips.

As mentioned previously, the design of winglets is difficult and requires a good deal of computing and flight testing to ensure that they do more good than harm. A badly designed winglet can act like an airbrake. Winglet design was the subject of two of the scientific papers read at the OSTIV Congress held during the championships. It seems certain that the outermost parts of any wing should be curved upwards and any amount of this upward turn is beneficial.

The other interesting aerodynamic feature was the appearance, in some

quantity, of wing bug wipers. These devices are not new, but they have only now reached a sufficient reliability to make them worthwhile. Only about a dozen of the competing sailplane were fitted with wipers, but probably everyone will be using them, soon.

As a sailplane flies, the wing leading edges pick up insect bodies in the same way as a car windscreen or radiator grill does. The squashed bugs have serious effects on the airflow in the boundary layer, making it turbulent instead of laminar, and the glide ratio gradually deteriorates, especially on the vital, final stages of a race. The last fifty kilometres are often flown very fast at low altitudes where the insect population is high. Beetles with hard cases can be heard to ping off and they do not stick, but the softer bodied creatures make a nasty mess. The bug wiper is a gadget that, when the pilot chooses to use it, slides along the wing leading edge from root to tip and back again, wiping the bugs off as it goes. The wiper is driven outwards by aerodynamic force on a vane. It is prevented from sliding right off the tip by a fine cable, and the pilot then has to wind it back in, until it is needed, again. In some types of wiper, the reverse journey is automatic, which requires a clever device that resets the 'vane sail' when the tip is reached. It then tucks back to the root again. The pilots I spoke to said they used the wipers four or five times on a typical flight.

As a matter of interest to scale sailplane modelers, there follows a rough analysis of the sailplane types flown. These are not divided into sub types or marks. The Ventus 1 of which there were four, is very different from the later Ventus 2, 2B, 2C, 2S, etc., and the nine Nimbuses included examples of the Mark 3, 3DT, 3T, 4, 4D and 4DM. Everyone, of course, carried huge quantities of water ballast.

Standard Class Total entries 40

LS 8	23
Discus	12
ASW 24	3
LS 7	2

Fifteen Metre Class

Total entries 34

Ventus	21
ASW 27	7
LS 6	4
DC 800	1
DC 600	1
Open Class Total entries 18	
Nimbus	9
ASH 25	4
ASW 22	4
ASH 26	1

And who won? It was generally accepted that the French team, all of whom fly in the Alps every week, had a great advantage because of their local knowledge, but the Germans, Italians, Austrians and Swiss know these mountains too. In the end, the top three places in the Standard Class went to French pilots Caillard, Barrois and Lopitau. In the Fifteen metre Class the Germans, Meuser and Grund, took the top places and the Italian, Galetto, was third. In the Open Class, the French again won, Lherm and Hauss placing at the top, followed by Schroeder of Germany. Scoring the whole championships by national teams, the top three teams were: (1) France, (2) Germany, and (3) Netherlands (the flattest country of the lot!).

Models at St Auban

As part of the public entertainment at the World Championships, there were several displays of model flying, powered and gliders. For sailplane enthusiasts, the most impressive model was a one third scale Nimbus 4. This was perfect in every detail, with a wingspan of just over 30 feet. That is, true to scale, one third of the original's 26.2 metres. This monster was towed up, not by a model airplane, but by a full scale Jodel 'Bebe', a small, light single place plane which, with the Nimbus in tow behind, did not really look very much out of scale. The model Nimbus span must be about the same as that of the Jodel.

After release, the Nimbus did some simple aerobatics and a very fast, low run in front of the large crowd, and then after pulling up, for a short time circled in some weak thermal lift until called down by the authorities to allow space for full scale sailplanes. There was a good round of applause. The model weighs 23.5 kg. in flight (about 51 lb.). There are fourteen servos to



Nimbus 3D wing tips.



ASW 27, the latest in 15 metre class. Flaps and ailerons, winglets, water ballast. Pneumatic turbulator on flap underside.



Typical winglet.



Winglet with turbulator.

drive the controls - elevator, rudder, ailerons, flaps, airbrakes, retracting wheel and tow release, and two battery packs in the model. Building time was 900 hours and the model has completed more than 100 flights without accident.

Rather surprisingly, each wing was built in one piece, while the full scale Nimbus 4 wing divides into six sections. To carry the model about requires a box over fifteen feet long, which is fitted on the roof rack of the owner's large van. The Nimbus 4 model comes from Marc Haus Modelisme. The address for inquiries is 4 Rue Scarabels, F-67 500 Haguenau, France. I do not know if kits are available. A large Discus model was also shown, doing aerobatics, but against the huge Nimbus it did not look specially big.

On another day, flights were made by what must surely be the noisiest model aircraft in the world. This was a delta, powered by three large pulse jet engines. It flew very fast and the noise was deafening. In its awful way it was very impressive, but it must require special permission every time it flies. It

was loud enough to disturb lectures going on at the time in the OSTIV Congress, which was in a building about quarter of a mile away from the launch pad. Three pulse jets are certainly louder than the aerobatic full sized aircraft that also put on a display. The speed of this model was probably in the neighborhood of 150 mph.

Almost twenty years ago, in 1978, I attended the World Championships (full scale) at Chateauroux in central France. At that time French model fliers were already launching big scale sailplanes by aero tow, and put on displays every day to entertain the crowd, while the contestants were away on their tasks. They even tried towing a big Salto model behind a Piper Pawnee (full scale), but the Salto broke up in mid air on this occasion.

There was also, even then, a free flight solar powered model which flew, without any storage battery. It was able to climb only when the sun shone at right angles to the wing that was covered with solar cells. When the model was banked the wrong way, it lost power and descended, but picked up again when it was on the other side of the circle. It seemed to me then, as it still does, that European model fliers have something to teach the rest of us. ■



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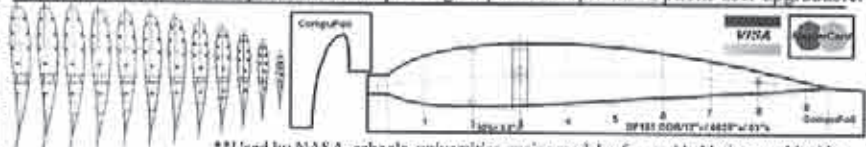
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Mastering Flap Setup on JR Radios

...by Rick Eckel
RAEckel01@aol.com
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Winter Springs, Florida

The JR sailplane radios continue to be very popular in our club, and I frequently help new owners work out their programming difficulties. By far, the most confusion seems to be over how to get the flaps on a full house sailplane to perform all those neat tricks the big boys use! ...Or, how to get them to stop performing those unwanted tricks!

Setting up flaps on JR radios need not be particularly difficult, but it requires that the basic servo installation be well implemented and that you have a basic understanding of servo natural zero, sub trim adjustments and travel adjustments. It also requires some jumping around in the menu system, which is not always intuitive. But, primarily, you need to understand that, in the sailplane model type, there are two controls on the transmitter used for flaps, what I call a primary control and a secondary control. The primary control can be either FLAP/POT 6 or the FLAPS (three position) switch. The secondary control is the spoiler stick. These two controls are completely independent and are set up independently, once the proper servo installation has been performed.

The following discussion and setup applies to the JR 783, 388 and, with minor menu differences, to the 8103. The JR347 radio is much the same as its successors, but it does not have the ability to set the primary flap control to the three position switch and, thus, does not support presets using the three position switch.

The setup I will describe allows easy mixing to flaps, avoids having to set offsets in auxiliary mixes to flaps and, generally, makes the radio easy to get along with, since once the setups are done, minor adjustments are easy. It is not the only way to set up the radio, but I think it is the most straightforward and simple.

Setting Up Flaps for Camber, Reflex and Landing

In the simplest terms possible, the following two statements sum up flap programming for the JR radios. They are profound and should be committed to memory (Or, incorporated into your personal mantra!).

Preset launch camber and preset reflex are set up on the FLAPS (three position) switch and adjustments are made using flap travel adjustments (T.ADJ FLAP).

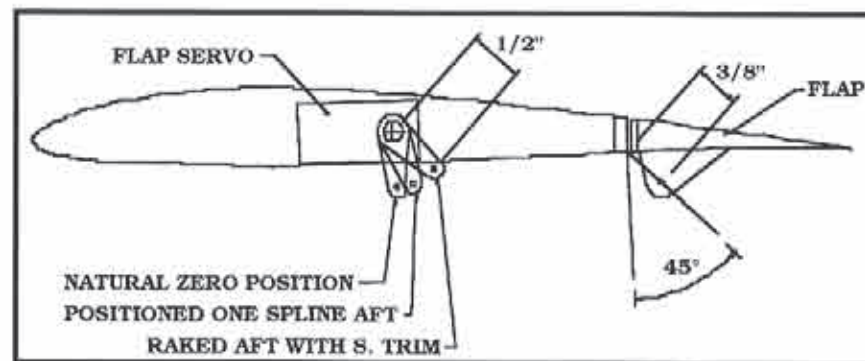
Thermaling flap camber and landing flaps are set up on the spoiler stick, selected with the crow (CROW/AUX3) switch and adjusted using the spoiler mix (MIX SP:) settings.

Setup Procedure

The following setup procedure is listed step by step in order to keep the procedure simple. The steps might be performed in another order, but doing so may cause confusion. Each should be successfully completed before proceeding to the next. The manual can be referenced to determine the button pressing procedures required to accomplish each of the setup steps. I always set up flaps first on a new ship, because it is the most difficult part of programming the radio. Once the flaps are set, the remaining controls are very easy to do and will not affect the flap setup.

The setup assumes that the model memory is clear of all settings. If a model memory has been used, or set up previously, it should be reset before starting this procedure. You should also note that the steps are concerned only with settings that affect the flap setup. Choosing a model name, selecting the proper transmit mode, etc., are left up to you. The setup also assumes that you have plugged the port (left) flap servo into channel 6 (FLAP/aux1) on the receiver, and the starboard (right) flap servo into channel 7 (AUX2).

If you do not have a seven channel receiver, you cannot have independent flap servos. You will have to use a y-connector and a servo reverser to get two flap servos to work together out of



channel 6. Although using a 6 channel receiver is workable, you will give up all transmitter based adjustability between the servos, and the flaps will not be able to function as slaves to the ailerons.

Initial Radio Settings

Model Setup Menu (Power up radio while holding two buttons.)

- Enable Dual Flaps (DUA.F ACT). [This setting slaves channel 7 (AUX2) to channel 6 (FLAP).]
- Set primary flap control to the FLAPS switch (FLAP SW+T). [This setting switches primary control of the flap channel (FLAP) to the FLAPS (three position) switch.]

Function Setup Menu (Press two buttons simultaneously after power up.)

- Inhibit FLAP/POT.6 (POT.6 INH) and AUX 2/POT.7 (POT.7 INH). [This setting prevents these pots from influencing the flap positions during setup and operation. You should also probably inhibit FLAPERON/POT.5 (POT.5 INH) to keep it from affecting aileron trim.]

Servo Installation and Initial Adjustment

- Temporarily install the servos with control arms, but without linkages to the flaps. Each servo is to have its output shaft pointing to the wing tip.
- Set servo travel directions for servos to pull flap down when FLAPS (three position) switch is pulled, and to push flap up when the switch is pushed up from neutral. [Usually requires reversing the

servo throw directions on ch 6 and ch 7 (REVERSE SW function).]

- Place the transmitter three position switch in the center position.
- Set travel for flaps (T.ADJ FLAP) to zero for both travel directions.
- Check that changing FLAPS (three position) switch causes no movement of the flap servos. Check that twisting FLAP/POT.6 or AUX 2/POT.7 does not cause any movement of the flap servos.
- With the servos now positioned at their natural center point, set the angle of the control arm one spline aft of 90° on both flap servos.
- Use S.TRIM for FLAP and AUX2 to rake the servo arms back an additional 15 (approx.) degrees. Don't use all the sub trim available. You will want to leave some leeway for field adjustments later. This may just about bottom the servos against the wing bottom surface. Make sure that both control arms are positioned at the same angle aft toward the flaps. (See diagram.)
- Install linkages from the servo to the flap horns and adjust linkage so that flaps are in their neutral position.

Setting Up Landing Flaps

- Go to MIX SP (Butterfly mix on the 8103) and place the CROW/AUX3 switch into the position you prefer for landings (forward or aft switch position).
- Move the spoiler stick to the full flaps up position (fully up).
- Set the spoiler offset at the fully up position (MIX SPOI OFFSET and

press the CLR button). The displayed value will change from 0 to something like +172.

- Go to the spoiler mix setting for flap (MIX SP:F) and pull the spoiler stick down to the full flaps down position. Add flap mix percentage until the flaps pull down to your desired full flap down position. (If you cannot get a full 90 degrees of flap travel, you need to lengthen the servo arms or shorten the flap control horns.) The starboard slave flap (AUX2) may not follow the master quite correctly at this stage.
- Adjust the slave flap to the same amount of travel as the master using T.ADJ AUX2, while full flap down is applied with the spoiler stick. You may have to adjust S.TRIM AUX2 also, in order to get the flap up position of the slave to match the master precisely.
- Check travels by moving the spoiler stick through its throw. Make any additional fine adjustments to T.ADJ AUX2 and S.TRIM AUX2, as necessary.
- Set up the elevator compensation to -40 or so, using the elevator setting in the spoiler mix (MIX SP:E). (This will normally be down elevator, but might be up on some rare air-planes.) -40 is my guess at an initial setting. Fine tune this setting during flight testing.
- Add aileron reflex or camber, using the aileron setting in the spoiler mix (MIX SP:A), if you desire.

Setting Up Adjustable Thermaling Camber

- Move the CROW/AUX3 switch to the opposite position.
- Pull the spoiler stick to the position where you want maximum camber to be.
- Use the flap (MIX SP:F), aileron (MIX SP:A) and elevator (MIX SP:E) settings in the spoiler mix to camber the full trailing edge and put in any required elevator compensation.
- Adjust to taste during flight testing.

Setting Up Launch Flap Preset

- Launch flap preset is handled by the primary flap control - the

Notes for Owners of JR347 Radios

Although to a large extent the above instructions apply to the JR347 there are some significant differences that must be recognized. As mentioned, the JR347 does not allow assigning the functioning of the flaps to the three position switch on the radio. This means that any launch presets must be obtained in another manner. Most 347 fliers I know simply use the flight camber mix (as adjusted in MIX SP) on the throttle stick for launching. They pull in full camber for the launch and release the camber just prior to the zoom. They prefer this method to presets, since they can vary camber during the launch. It is a perfectly viable option.

The JR347 has an adjustment called FLAP.P with sub menus that can be used to change the effect of the flap pot on the flap control surfaces, instead of using the T.ADJ FLAP settings. The servo T.ADJ FLAP must be left at 100%, in order for MIX SP to function in the 347. Therefore, the FLAP.P TADJ or FLAP.P INH must be used if you want to change or null the effect of the flap pot. Or, it might be used for some type of camber or reflex setting. I'll leave it to the reader to decide the best way to use it.

FLAPS (three position) switch.

- Move the FLAPS switch to your preferred launch position, usually pulled down.
- Use the travel adjustment for flap (T.ADJ FLAP) to make the flaps move to an appropriate launch position.
- Optional: If you want to have ailerons camber with the flaps, set up the F-AL mix to be enabled with the FLAPS switch in the launch position (FA:SW F-DN), and set the mix so that the ailerons move with the flaps. It will take a high percentage of mix to get a matching movement. No offset setting will be required.
- Optional: If you want to add an elevator preset, use the F-E mix, and set it up to be activated when the

FLAPS switch is in the launch position (FE:SW F-DN). No offset setting will be required, unless you want an elevator preset without any flap movement.

- Move the FLAPS (three position) switch to the neutral (center) position and verify that the flaps move back to neutral.

Setting Up Reflex Preset

- Reflex preset is also set up using the primary flap control - the FLAPS switch.
- Move the FLAPS switch to the position opposite your launch position.
- Use the travel adjustment for flaps (T.ADJ FLAP) to make the flaps move to an appropriate reflexed position. (Be careful not to stall the servos if the flap hinge gap closes completely.)
- Optional: If you want to have ailerons reflex with the flaps, set up the F-AL mix to be enabled with the FLAPS switch in the reflex position (MIX FA:SW FU+D), and mix the ailerons to move with the flaps. Notice that because of the switch

assignment, this setup will affect both the launch and reflex positions of the FLAPS switch. Another switch assignment or different mixes can be used if this is a conflict for you.

Completing the Setup

- Double check all of your control throws in all switch positions.
- Permanently install the servos and linkages
- Double check again
- Go Fly!

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The wings are made in America by Ron Vann, owner of Spectrum Enterprises. Ron is also an avid competition flier, and is considered to be one of the best wing manufacturers in the industry. Taking his years of experience in manufacturing wings, Ron has produced wings and stabs for the Condor that we feel are world class. Starting with the spar that Mark Allen designed, Ron uses only the best and most accurately cut foam cores available. He then uses hand-picked beech from Kennedy Composites, which is applied with West Systems epoxy.

CONDOR Tomorrow's Sailplane, Technology Today

This is after he has first reinforced the wing with carbon fiber and fiberglass. The servo wells are routed out, as are the flaps and ailerons. What this means for the sailplane enthusiast is a minimum amount of work before getting the sailplane into the air. The wing is light but strong enough to take "pedal to the metal" launches. Also available as an option is Ron's unique internal capped hinge line. This means even less work for the modeler.

The fuselage is made by Steve Hug, owner of the Fuse Works. Steve is another master at what he does. Fuse Works makes what we consider to be the best fuselage in the business. Steve uses only the best fiberglass and Kevlar™ available. All fuselages are manufactured using the West Systems epoxy. Steve's fuselages have the least amount of pinholes, if any, that we have seen. In fact, the fuselage is so pretty that many people do not paint it. The fuselage is extremely light, and yet strong enough for very aggressive flying and landing. For those with very little

building time, and those who don't like to paint, there is an optional pre-painted, in the mold, fuselage which includes a unique carbon fiber canopy.

All kitting is done at Slegers International's new and larger manufacturing facilities. We have spared no time or expense with supplying the modeler with the best materials available. The kit contains pre-sheeted wings and stabs by Ron Vann, fiberglass and Kevlar™ reinforced fuselage by Steve Hug, 3/8" diameter titanium wing rod from Kennedy Composites, optional 3/8" diameter steel wing rod by Squires Model Products, control horns and tow hook by Ziegelmeyer Enterprises, pushrods by Sullivan, or optional one piece steel rods. All wood is custom cut. Specially cut basswood of 60" is supplied to eliminate splices in leading edge, flaps and aileron capping. All balsa is hand picked, light to medium, to ensure light weight wing tips, stab tips, and rudder. Aircraft ply is used for the pre-fit servo tray and towhook block. A comprehensive instruction manual is included.

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Saturn 2M... \$300.00, ask about servo; WindDancer, my own design, have 4 to sell, a lot like the Falcon, 110" - 118" span, various airfoils... \$350.00 ea.; Synergy 91, very nice... \$400.00, ask about servo. Dale (Head Elf) King, (972) 475-8093, Texas.

Perigrin. Airtronics, w/141 (6) servos, 7037, 117"... \$400.00; 2M Duck, w/141 (6) servos, 3021, built by Jim Thomas... \$250.00; 650 Oly Elec., w/spd ctrl. Astro motor, battery, servos (2), folding prop, 2 piece wing... \$250.00; Silentus Elec., w/servos (2), motor, spd ctrl, bat, Futaba 4 ch w/receiver... \$195.00; Winchmaster by Don Goughnour, glider winch, w/electric dynamic brake, 12 volt, 2K ft. of nylon line, turn around, parachute, hi & lo torque, foot pedal... \$350.00; Futaba-FG gold series, 4 ch, w/ch 50 Rx... \$60.00; Futaba-FG gold series, 8 ch, w/ch 38 Rx... \$85.00; Futaba-PCM, 53.500, 8 ch, w/Rx... \$150.00; JR Century, FM, 7 ch, ch 44... \$70.00; 8" X 5" Fredette Racing Products, spun aluminum winch spool, w/F3B no backlash brake... \$60.00. U pay shipping. Bert, (517) 851-7386, <rmaldonado@dmci.net>, Michigan.

1/4 Roebers Pilatus B4, 3.75 meter span (147"), wing profile Ritz 3, NIB... \$495.00; 1/4 Roedel SuperCub (towplane), 2.687 meter span, wing profile Clark Y mod. (suitable motors are 160 T, 300 T, OS BGX-1, Brison 3.2 or similar), NIB... \$385.00; 1/4 Rosenthal Rallye Morane (towplane), 2.78 meter span (109"), NIB... \$495.00; 1/5 Wik Twin Astir, all glass, NIB... \$595.00. Contact Robin Lehman, 63 E. 82nd St., New York, NY 10028; (212) 879-1634.



International Scale Soaring Association

There is a growing interest in scale soaring in the U.S. We are dedicated to all aspects of scale soaring. Scale soaring festivals and competitions all year. Source for information on plans, kits, accessories and other people interested in scale. For more information, write to:

International Scale Soaring Association
37545 Oak Mesa Drive
Yucaipa, CA 92399-9507
e-mail: 70773.1180@Compuserve.com

Schedule of Special Events

Date	Event	Location	Contact
Sept. 19-21	Last Fling of Summer	Broken Arrow, OK	Jeff Naber, (918) 495-1028
Sept. 20	Scale Glider Festival	Costa Mesa, CA	Rick Briggs, (562) 433-6327
Oct. 4-5	CSS Pumpkin Fly	Cincinnati, OH	Ed Franz, (606) 586-0177 edkim_franz@msn.com
Oct. 4-5	24th CVRC Fall Soaring Festival	Visalia, CA	Phil Hill, (209) 686-8867
Oct. 11	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
Oct. 12	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Oct. 11-12	Fall Intergalactic HLG	Cincinnati, OH	Paul Siegel, (513) 561-6872
Oct. 11-12	Fall Soar	Bristol, VA	Greg Finney, (540) 645-5772
Oct. 25	TPG Fun Fly	San Diego, CA	Don Richmond, (619) 587-0226
Nov. 1-2	Aerotow Fly-In	Pensacola, FL	Asher Carmichael, (334) 626-9141
Nov. 2	2 Meter TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Nov. 8	CSS Turkey Fly	Cincinnati, OH	Ed Franz, (606) 586-0177 edkim_franz@msn.com
Nov. 8	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
Nov. 15	New England R/C Soaring Convention	Portland, ME	Steve Savoie, (207) 929-6639 jim.armstrong@juno.com
Nov. 16	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Nov. 28-30	24th Tangerine	Orlando, FL	Don Cleveland, (407) 696-7516
Dec. 6	HLG Contest	San Diego, CA	Tom Clarkson, (619) 486-4068
Dec. 6	Slope Combat	San Diego, CA	Arthur Markiewicz, (619) 753-3002
Dec. 7	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Dec. 13	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
Dec. 14	F3J	San Diego, CA	Mike Ziaskas, (619) 484-7596

Schedule of Special Events - Outside U.S.A.

Sept. 13-21	World Air Games	Turkey	Turkey Aeronautical Association*
Sept. 20	R/C Glider Euro-Cup	Uetze, Germany	Lars Biermann 011-49-5173 1377
Sept. 19-20	DMFV Scale & Semi-Scale, Germany	Winfried Roder Bruchstr. 16 52152 Simmerath tel./fax: 011-49-2473	c-mail: Winfried.Roder@t-online.de
Aug. 1-3	1st Aerobatic Scale Glider Contest, Germany	Frank Oeste, 011-49-6103/81801 Harold Seitz, 011-49-2236/67473 Jan Kurt Hoffman, 011-49-29042848	
Aug. 1998	F3J World Championships, organized by BARCS		

*Turkey Aeronautical Association - tele. 903123104456/903123104840

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Wind Tunnel Tests of Wing Profiles

...by Martin Simons
Stepney, South Australia

(An expanded version of a talk given at the LSF Conference held at Jerilderie, New South Wales, Australia, Easter 1996.)

Part V

Spanwise variations

An important matter affecting the drag measurements is that they are averages of the drag in the spanwise direction. This needs some explanation.

In the very early days of testing, seventy and more years ago, the drag, lift and pitching moments were actually measured as forces on the test piece suspended by wires or struts in the wind tunnel. The little wing models had tips, sometimes rounded, sometimes cut square, around which the usual losses associated with tip vortices occurred. The aspect ratio of the test model was always stated in the published results, indicating that the standard corrections for induced drag and induced angle of attack, had to be applied to them before they could be used in aircraft design. (Model fliers often did not know this and were totally misled when they looked at test results.)

But at least the drag figures published were applicable to the entire wing test piece, from tip to tip. This was a kind of automatic averaging process. A whole wing, although small, was being tested, and any local variations in the spanwise sense were automatically

absorbed in the final result.

In nearly all testing done since about 1935, the tip vortices are removed by making the test model bridge the entire tunnel, from wall to wall. The flow is supposed to be perfectly two dimensional. That is to say, the air particles arriving at the leading edge of the wing, are expected to flow over or under it with no deflection to either side. Test figures are now always published for a theoretical 'infinite' aspect ratio. (See notes in Fig. 3, RCSD, June 1997.) What the results purport to show are the 'pure' section drag and lift coefficients without any induced effects from tip vortices. The designer still has to apply aspect ratio corrections but, at least in the early stages, starts with the various profiles all on a similar basis.

In the Stuttgart wind tunnel, the lift is assessed by taking pressure measurements through small holes in the sides of the tunnel wall. If the pressure pattern is known, the lift can be computed. There are some inherent errors, but these can be calculated and almost completely removed from the results.

At Princeton and UIUC the lift forces are measured by actual weighing, using a fairly simple apparatus incorporating force transducers. This is satisfactory for dealing with the fairly large lift forces. This method too has some inherent errors, of a different kind from the pressure measuring technique, but they also can be calculated and almost completely removed from the results.

However, with 'wall to wall' mounting, it is no longer possible to measure the drag by simple weighing balances, even if these are very sophisticated. As already mentioned, the forces are very small but, more importantly, there is interference with the tunnel walls and end plates, there are often small leakages at the ends of the test pieces, and so on. These prevent any direct method of weighing the drag force.

In many modern wind tunnels, drag is measured indirectly by means of a rake or comb of fine, open ended tubes, rather like hypodermic needles, mounted with open ends pointing upstream some small distance behind the test wing. The basic idea is shown in Figure 14 here, taken from Fig. 2.8 in the UIUC volume. The airflow ahead of the test wing is constant across the tunnel from wall to wall, in both vertical and horizontal directions. At least, it is as constant and as free from turbulence as the tunnel engineers can make it. As the air passes round the test wing, the effect is to slow down the flow in the fashion indicated, producing a wake. A measure of the drag can be arrived at by sensing the pressure at a number of points and integrating the area on the diagram where the flow shows this measurable loss of momentum. The calculation is converted to a

drag coefficient. For large wings at high speeds this produces very reliable results.

(Part VI continues the discussion with "The Boundary Layer". Ed. ■)



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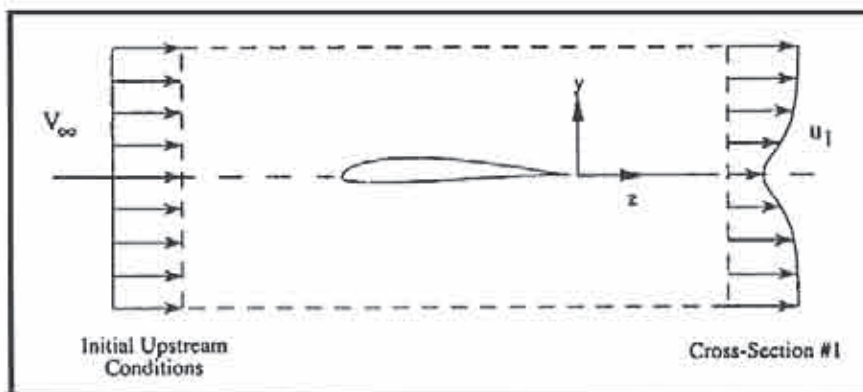
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**Sixth Annual
Mid-South Soaring
Championships**
...by Ron Swinehart
Huntsville, Alabama
Photography by Russ Behr

**SCORE
KEEPERS**

Thermal Duration High Over All Champion - Ron Swinehart (L), CD Ed Wilson (R), and Bob Sowder, smiling in the background.



Valeta Glover



Missy Banko



Deborah Fara



Jean Harris

The Sixth Annual Mid-South Soaring Championships was held in Huntsville, Alabama on 19 - 22 June, hosted by the North Alabama Silent Flyers of Huntsville, Memphis Area Soaring Society of Memphis, and the newly added Louisville Area Soaring Society of Louisville, Kentucky.

The cross country event was CD'd by Rob Glover and was held on an approximately 18 mile course on Thursday and Friday. The weather on Thursday and Friday was good, after this part of the country had rain for 18 of the past 20 days. Seven teams made attempts at the course with only one of those being able to complete. Rob Glover of Huntsville flew the total course in 58 minutes and 47 seconds, with an original design plane by David Godfrey. Two goal and return I/SF Level IV requirements were also accomplished. Harold Saunders achieved 12.1 miles, 8.65 miles for Bob Sowder, and 8.2 miles for Cliff Smith.

Hand launch was also

flown on Friday at the Hobbs Sod Farm thermal duration site. CD'd by Rex Powell, five rounds were flown, with man on man scoring within each of the three flight groups. Flight group placement was also changed between each round. Hand launch results were: (1) Ed White, (2) Scott Hunt, (3) Don Cleveland, and (4) Michael Wilson - Junior.

There were several representatives of the modeling industry in attendance, who were more than willing to answer questions and help individuals with their flying questions: Ed Slegers of Slegers International, Scotty Meader of RnR Products, Paul Perret of Perret's Studios, Roy Simpson of Dream Catcher Hobby Inc., Trey Finney of Finney's Hobbies, and Tim McCann of McCann's Products.

Saturday morning dawned crystal clear, but all was not well in Mud'sville. A small cell formed right on top of Huntsville, and proceeded to grow until it covered the entire northern part of the state. It started to rain at 9:00, just as the

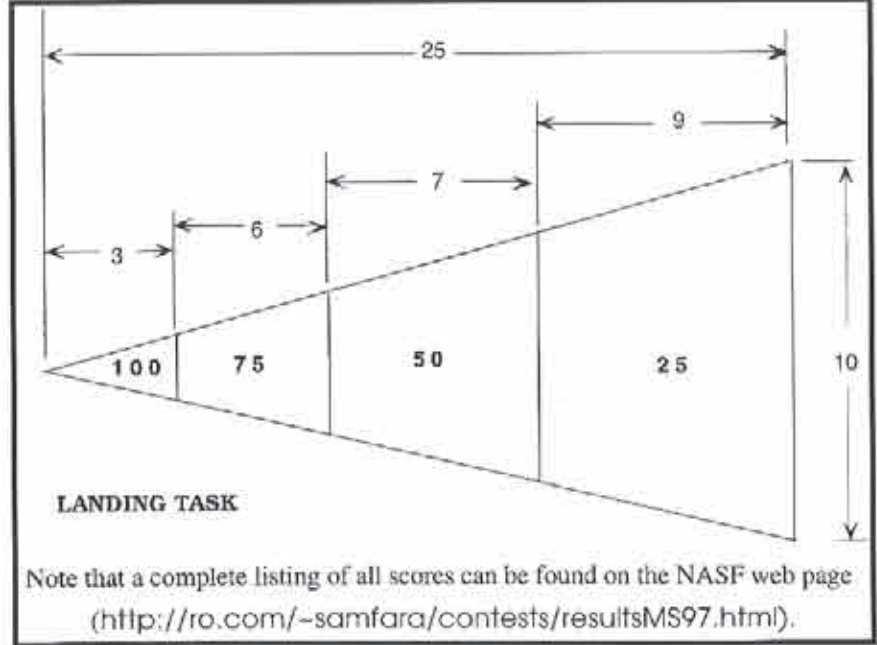


(L.) Guest speaker, Chuck Anderson. (R) Harold Saunders at the Cross Country site.

pilots meeting was getting started, and it rained for the next 5 hours. Ninety six persons had signed the safety certification, but only 80 were left, when the rain finally stopped, at 2:00 P.M. Three rounds were flown, with 50 pilots being in the expert class and 30 pilots flying in the sportsman class. At the end of flying, while the scoring was being completed, the drawing for the huge raffle was held.

There were three computer radios, four full house sailplanes, and at least six slope or good beginner kits, a fiberglass fuselage, Chuck Anderson's Deluxe Airfoil plotting program, and several other hobby related items.

There was also a free ride in a full scale sailplane. For the third year in a row, plans had been made to land a sailplane at the site, but once again the weather prohibited this from taking place. Contributors to this years raffle were Horizon Hobbies (JR), Futaba, Slegers International, RnR Products, Inventec Corp., Perret's Studio, Viking Models U.S.A., SIG, Dream Catcher Hobby Inc, DJ Aerotech, Hobby Hangar, Patterick's Inc., SR Batteries Inc., Major Hobby, B²Streamlines, Sailplanes Unlimited Ltd., IJM Associates, and Tim McCann. Once again, Tom Jones provided the MSSC Tee Shirts, which have grown to be a



great crowd pleaser.

Chuck Anderson gave a nice talk, at the well attended Saturday night banquet, on the past 30 years of sailplane design and what the future may hold.

As fate would have it, it rained most of Saturday night, but it stopped around 7:00 A.M. Sunday morning. In an effort to minimize the damage to the sod, all cars were parked on the high ground, which was about 100 yards from the scoring tents. Sixty five pilots braved the mud; the flying got under way around 10:00 and, once again, it was decided to limit the flying to three rounds. Believe it or not, the sun was actually shining by 10:30. Ed Wilson of LASS CD'd Sunday's flying, and he opened the pilot's meeting with an invite to next year's event, which will be held in Louisville, Kentucky. The rest of the day was uneventful, with all flying being completed by 2:30.

Once again, our scoring was done by Valeta Glover, Deborah Fara, Missy Banko, and Jean Harris, wives of the club members. All scoring was done quickly and postings were available with minimum delay. The final results for each day's flying were also completed in a very short time. The radio impound was run by Sam Fara, Joe Byrd, Jane Stone, Bud Harris, and Jerry Hethcoat, and was also done with real efficiency, with delays in flight group call ups being held to a minimum. A sure sign of impound success was that no planes were lost as a result of frequency interference.

As a side note, the landing task for this two day thermal event, in my mind, accomplishes two things. First, no measuring is required to establish your landing score, which allows for quick removal of your plane from the landing zone. Second, this task is difficult enough as to cause the greedy to score zero, if they are not really good at landing, yet it is generous enough as to allow most people to achieve some landing points.

1998 Mid-South Soaring Championships

...by Ed Wilson

Now that the 97 version of the Mid-South (formally called Mid-South) is over, the members of Louisville Area Soaring Society (LASS) have been hard at work preparing for the 1998 Mid-South.

The flying site has already been reserved, and we are a long way toward putting together what we hope is the best Mid-South ever. I just returned from the Nat's and the interest is strong from the northern clubs. This Mid-South is shaping up to be a real north-south battle.

At this year's Mid-South, I announced on Sunday some changes we are making. First, the cross-country event is gone. Low participation and no suitable site has forced us to drop cross-country. In its place, we will add Nostalgia on Friday afternoon, after the hand launch event. In addition, we are negotiating with a golf course to fly hand launch golf Friday evening. Our vision is that the young tigers will want to fly H/L Golf, while the more experienced flyers would prefer the nostalgia event. So, a flyer can participate in both events; we will run an open winch in nostalgia so a flyer can do their flights early enough to make it to H/L golf course.

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June 26-28, 1998

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Beginner's Views on Handlaunch

...by Bill Kuhl
Winona, Minnesota

When I started flying RC again after taking ten years off, I was looking for something different; luckily I discovered soaring. My first flights were with an Airtronics Eclipse electric glider, with someone who had done some soaring to help. He would say, "You are in lift," but I couldn't really tell. Then I noticed I was getting higher, then really high. "You got to get down man," he said. "How?" I asked. "Put it in a spin," he told me. That I did, as the plane drifted over a four-lane highway and some backwater from the Mississippi. At times, I would lose sight of the glider; my hands were shaking so bad, I could hardly hold the transmitter. Finally, I was down to a reasonable height, and brought the plane in for a landing. My first thoughts were, "Maybe soaring isn't for me," but later I thought, "This has to be the most fun you could have with a model airplane."

I bought another used plane and a hi-start, flying maybe once a week for the rest of the season. My friend was flying a Skeeter on a small hi-start, so I bought a kit because of the price. People on the RCSE listserve didn't have too much good to say about this plane, but I built it anyway over the winter. The parts did not fit perfectly, an understatement, but I did get it together. My only modification was to put carbon fiber under the bottom spar. I covered with Mica Film, and jap tissue on the tail. Installing the radio was tighter than I was used to, but I got the job done.

My first couple of times out hand tossing, I never flew for more than a couple of minutes in a flight. I would bump lift, but couldn't seem to hang on to it. That would frustrate me, and I would keep throwing, until my arm was sore. I knew of a couple of guys that were into handlaunch, 30 miles away, so I went to their field to meet them for a little hand chucking. The day started out cloudy, but about noon the sun came out.

As the conditions improved, I finally connected with some lift. Some more tossing, and I was up and away; this time I could have gone to speck height. Boy

was this cool, the little plane bouncing around in the sky; my batteries had been on for awhile that day, so I tried a couple of loops to lose altitude. Sure enough, I lost the thermal, and came down shortly, grinning from ear to ear. I was hooked on handlaunch.

About this time, I had bought Paul Naton's "Endless Lift" video, and decided I had to have a Climmax HL. When I first flew the Climmax, I was expecting magic. The plane flies good, but you still have to find decent lift and stay in it. Now I had two planes, so I could fly for hours without recharging. I have larger gliders too, but lost interest in flying them; I was going to be a handlaunch champ.

Now it was an obsession; I was flying almost every day, when it wasn't raining hard, or gale force wind. Funny thing; I was finding lift at odd times, like when it was almost raining, or the sky looked like you should run for cover. To understand flying conditions better, I purchased a book, "Understanding The Sky", by Dennis Pagan, and learned that unstable conditions were good for soaring.

Many people have said that handlaunch improves flying, and I believe it completely. A handlaunch reacts more visibly to lift and sink. When you are in a good thermal, that little plane can be bouncing around like crazy; now I see why Dave Thornburg referred to it as riding low-level bucking broncos. Another thing, if you were afraid to fly close to the ground before, you will get over it when you fly handlaunch; if you haven't tried this form of soaring, you are really missing out. If you are afraid of crashing in the training process, there are now several EPP foam handlaunches available. So, go do it by hand! ■

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Musings from the Elf

...by Dale King
1111 Highridge Drive
Wylie, TX 75098
(972) 475-8093

Howdy! Let me introduce myself. I'm Dale, sometimes called the Head Elf by friends. I started flying R.C. sailplanes in December 1987, and have been hooked ever since. I started scratch building composite planes with the purchase of a Special Edition fuselage from Jerry Slates, Viking Models, U.S.A. My good buddy, Gordon Jones, and I put our heads together to develop wings and a tail for this bird. For those of you new to this magazine, Gordon wrote numerous articles under the heading of "Winch Line".

With this short introduction, I would like to pick up the story that Gordon began in the May, 1995 RCSD. This article dealt with the development of a fuselage that we used to explore different airfoils, using the same basic planform. We had set the parameters for the fuselage that gave us 12.5 inch nose moment, and 24 inch tail moment with a slightly raked fin. This project became known as the Outrider. I subsequently have called my plane *The Wind Dancer*.

For the wing, we wanted an aspect ratio of 14:1 minimum. We settled on a 110" - 112" span, which has yielded 885 to 900 square inches of wing surface. The first airfoil we used was one I developed and Gordon refers to as a very "pleasant surprise". We

commonly call it the K-Model, although it does have a number: K9223. 'K' for King, 92 for 9.2 thick, and 23 for 2.3% camber. Makes sense to me! This was developed by using a SD7080 for the top half of the airfoil and HQ 2.5/9 for the bottom half of the airfoil. Then, I made adjustment to the thickness and camber to the specs. mentioned above. This plane was flown hard, tested, and abused. (But it is still flying today!)

From this plane we made a change in the wing incidence angle and removed a flaw that was in the tail boom. These changes required us to build a new mold, but the end result produced a very nice fuselage that we have been very well pleased with. It has clean lines and is very streamlined. With a slip on nose cone, you can use mini or micro servos in the fuselage.

Now, back to the wing. The first airfoil was the K-Model with the 9.2 thickness and 2.3% camber full span. I built the next one with 2.3% camber at the root and 3% camber at the tip, with a small amount of washout built in. From my notes and memory, I can count five K-Model wings; some had PVC spars with T-6 aluminum carry throughs, while others had balsa spars with fiber glass on each side and 3/8 O.D. carbon fiber rod inside a brass tube for carry throughs. I used white bead board foam on some and pink extruded foam on others. The one I'm now flying has pink foam, PVC spar, T-6 aluminum carry through, and Kevlar™ hinges for flaps and ailerons. It is a 112" span, with a flying weight of 69 ounces. I have been flying this version for over a year; it thermals well and has very good wind penetration. It also has a good speed range. K-Model #6 is laying on the work bench now at 118" span; same specs. as above. We'll see how this one goes.

Airfoil # 2 was being built while we were testing (#1 K-Model). Number 2 is a pure, unaltered SD7080 on 110" span. It also flies very well, shows lift quite well, is stable and fast enough, but a bit slower than the K-Model. It is good handling and a comfortable plane to fly. A good choice for most flyers.

On Airfoil # 3, I again started mixing and matching the root in SD7080; the

tip is a SD7037 with constant transition from root to tip. This is another way to increase camber as you go outboard. SD7080 is about 2.5% camber and SD7037 about 3% camber. I have been flying this one a lot lately, and now have it dialed in to suit my flying style. My next step is to take it and my K-Model out together, and fly one and then the other for a one-on-one comparison. Could get very interesting. We'll see!

Airfoil # 4 is a pure SD7037. (Yes, sometimes I stick with the book.) On this one, I used a Thermal Eagle planform with turn-up tips. Nice wing! Before I could finish building this plane, I sold it to a friend who had destroyed his plane. Fortunately, he let me set it up and trim it. So, I did get to fly it some, but not enough to really make any final comparison with the other airfoils. I have a new one designed, so we'll get there.

Airfoil # 5 is a variation and departure from my standard parameters that had been followed to this point. It is a SD7032 airfoil, built as a polyhedral on the same fuselage. To make a long story short, I did not have enough poly-break in the wing; boy, did this ever make it hard to turn. Wow! So, back on the workbench. At this point, I decided not to cut the wing, but to add aileron. I was able to get a 15" long aileron in, without cutting into the poly-break joints. Adding servo leadwires through a poly-break, on a wing that is all ready finished, is a bit tricky, but manageable.

With these modifications made, I was back on the flying field. Up on the winch it went, and I tried some turns, only to find that I needed a little more rudder throw mixed in with the ailerons. With these problems out of the way, I returned to paying attention to the airfoil. The first thing I noticed was that it was a little too slow; a bit of nose weight (1/2 oz.) and retrimming brought the speed and performance up to, what turns out to be, a very nice flying plane. It works light lift well and slows down for landing. (Yes, it

has flaps.) I may have to try this one built to my standard planform.

Well, that more or less brings us up to date on what has been built and tested. My record shows that I have built some 85 sets of wings, most of course for other people. So, what's next? I'm looking at the pure SD7037 mentioned in this article, and my most favorite of all, that I have not used on this fuselage: an HQ 2.5/10 transitioning to HQ 3/9. I've used this on my Condor fuselage with 3 piece wing, and also on a Mako fuselage. I'm looking at the possibility of glass wings and V-tail.

Looking at my inventory of planes, I'd better start selling some, so I can finance these new projects. Yes, as Gordon mentioned in his article, this has been an interesting project, and has brought a lot of rewards. And, I hope this will encourage some of you to do some experimenting. Who knows what you may come up with!

Go fly with the eagle. ■

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Why Ballast?

("...The answer is
blowin' in the wind!")

...by Dave Register
Bartlesville, Oklahoma

IHATE flying in the wind! Can't stand it! Drives me nuts! When I'm at the winch and gotta hang on for dear life before launching, it just isn't a whole lot of fun.

Unfortunately, that's life in the mid-West. It's rare when the wind doesn't come up sometime during the day. After two miserable contests in gusts of 15 to 25 mph (3 counting TULSOAR's Last Fling of Summer), looks like I've got to find some way to live with it.

When you think about it, there isn't any great mystery here. In calm air, you're used to moving around the field near your optimum cruising speed (max L/D) looking for lift. When the wind comes up, the lift is still there. Sometimes, even more, when a good wave gets working over the field. It's just hard to get any forward penetration to get there. Or, if you follow the thermals downwind, it's REAL tough getting back.

We've all seen some of our better flyers adding ballast under these conditions, or breaking out the RC15 wings. What does this really do for you? Let's try some numbers.

Roughly speaking, you can multiply the windspeed in mph by 1.5 to get the wind speed in feet/second. Under normal conditions in Oklahoma, we're probably getting winds of around 5 mph. On the other end of the scale, I just don't want to fly when it gusts much over 25 mph. That gives us a wind speed range of 7.5 to 35 feet/sec. Now, a typical sailplane will have a max L/D at around 20 to 25 ft./sec. So, on a normal day, you're covering the field at around 15 feet/sec., while on a windy (contest!) day, you're going backwards. Easy to fix; stick the nose down.

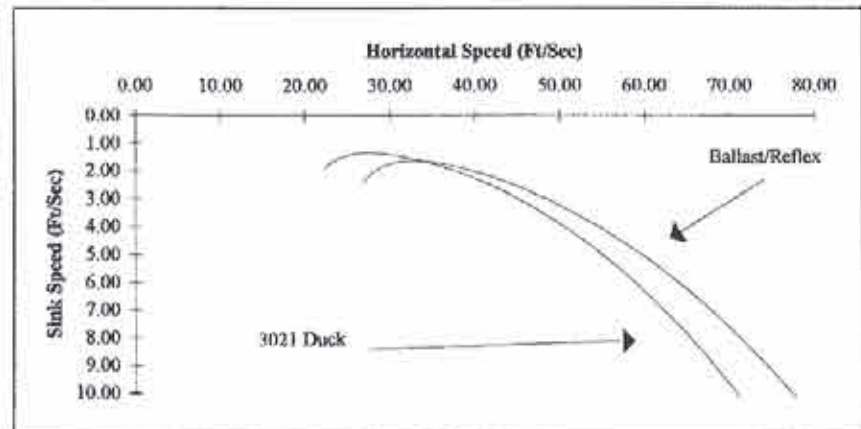
OK, but remember that you were at your best L/D. Go a lot faster, and you start coming down pretty quick! The better option is to add some lead and use a lower camber airfoil.



Dave Register's Semi-Scale Diamant

Dave says, "This was my 'first sailplane', and was scratch built from a plan sheet that came with the fiberglass fuselage. At the time, Adele and I were in graduate school at U.C., Riverside and living in married student housing. The rather small room in the back of the little hut was my office/building room. After finishing one of the wing panels (~60" each), I called to Adele to come see this new work of art. She was in the kitchen and told me to bring it out there. The wing was unpinned from the board; I turned, and excitedly walked through the door to the kitchen. Me and about 2-1/2 feet of that wing made it through! After considerable repairs, it had a long and successful history of flight. The fuselage is still down in the basement, but too brittle for any further service." (Photo and art work by Adele Register. Original photo printed over 20 years ago in RCM. Ed.)

Dale Nutter, who regularly ballasts his planes for our local conditions, suggested that 10-12 oz. of lead is about right for a standard class ship in our gusty conditions. So, let's try the following example. Suppose you add about 12 oz. of ballast and run reflex enough to knock your camber down. What happens? In the figure, I've plotted an estimated performance map of my Standard DUCK under normal conditions and for the ballasted/reflex setup. What we're looking at is a rough idea of the horizontal speed plotted against sink rate for a SD3021 wing at a loading of ~10.5 oz./sq. ft. compared



with 12 oz. of lead and reflex to cut the camber down to about 1%. The high point of each plot is the minimum sink position. A line drawn through zero that just touches each curve is the max L/D point. For the standard DUCK with no ballast, the Max L/D occurs at about 28 ft./sec.

Now, if I want to cruise around the field in a wind of 20 mph (30 feet/sec.) at the same speed **relative to the ground** as in normal air, I've got to hit upwards of 45-50 feet/sec. That is, to cruise at 15 feet/sec. over the ground, I need to be traveling at 45-50 feet/sec. through the air.

What I see from the plot is that to go that fast without ballast, I'm going to sink at over 3 feet/sec., whereas the ballasted case keeps me at a little over 2.3 feet/sec. sink rate. That's a big difference when you're trying to get upwind to either find the wave or get back to the landing circle. In fact, even though the sink rate is higher at min. sink for the ballast/reflex case, at any speed higher than that, my efficiency is better and improves (relative to the unballasted case) the faster I go!

As an example, suppose you hook a good thermal and follow it downwind. You've got your max. now, so you leave the thermal at 500 feet and start to come back. With a 3 ft./sec. sink rate, you'll be on the deck in ~170 sec. At 2.3 ft./sec. sink rate, you've got ~220 sec. For these two cases, that gives you ground coverage (at 15 ft./sec.

over the ground) of about 2500 feet and 3250 feet, respectively. The difference is the length of over two and a half football fields.

So, what's the downside? Think about your downwind leg. If you're going 45 ft./sec. into a 30 ft./sec. wind, and make a downwind turn, you're now going 75 ft./sec. with respect to the ground. That's gonna eat up the acres right quick. The natural tendency is to slow down. However, what looks fairly brisk as ground speed can easily get below stall speed relative to the wind, or at least make your speed low enough that your turns get real mushy.

So, keep your speed up on the downwind leg, right? Yes, but! Remember that your speed relative to the wind may be fairly slow, but relative to the ground you're carrying a whole lot of energy. The difference in energy at 15 ft./sec. and 75 ft./sec. is a factor of 25! A downwind approach will not only be haulin' grass when you land but, if you hit something, or someone, there's going to be major league damage or injury! So, when you're loaded up, keep your downwind runs to a minimum!

Well, I guess that's the message; there's a big advantage to flying ballast/reflex on a windy day. But it takes a lot of practice to know how to handle it. If you've got a normal day you get to fly, don't back down when the wind comes up. Throw in the lead and practice, practice, practice! ■

1997 INTERNATIONAL HANDLAUNCH GLIDER FESTIVAL

Reported by David M. Sanders

Photography by Shelby Sanders
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The weekend of June 6th through 8th in Poway, California saw the Torrey Pines Gulls' hosting of their fourth annual International Handlaunch Glider Festival, sponsored by Airtronics, Inc., arguably the most prestigious event in the handlaunch world.

What is a world class event made of? Planning, organization and hard work by a dedicated club's membership as well, as an excellent, competition worthy site. The Gulls have all of the above, as well as experience. As one of Southern California's most competition oriented clubs, they've developed a particular flair for putting on big events and running them smoothly. A little luck is helpful, too, and the weather did work for the event with varying conditions on both days putting even top competitors hard at work to rise to the top.

This year's event brought out 62 registered entrants from across the U.S.; the roster represented a who's who of some of the biggest names in thermal soaring, including F3B World Champion Daryl Perkins (defending his '96



Two aircraft lock horns. One mishap like this can and will take you off the 'first page' every time in an event as competitive as this! Neither plane will finish this round, but both will fly again, fortunately.



Steve Cameron's Dodgson Orbiter 95. Notice cruciform tail arrangement. This style of tail group is gaining popularity and is also present on the winning 'Maple Leaf' design.



C.R. Climmax PF comes around the edge of the field prior to landing. A popular sport design, Paul Naton flew his to a seventh place finish.

IHLGF title) and the entire '97 U.S. F3B team of Gordon Jennings, Randy Spencer and Joe Wurts. Many of today's brightest designers were also present to put their fine ships through their paces. As an airframe engineer in the HLG community, the IHLGF is a must-attend event and they did indeed come! The Festival is one of the few venues where you can actually meet these talented individuals in one place all at one time; a unique treat.

Flying was conducted in 10 main rounds with the first six held on Saturday and the remaining four on Sunday. Sunday afternoon saw the running of the final three championship fly-off rounds (11 through 13). Tasks for each round were as follows:

Saturday:

Round 1 - Most flights in a ten minute window with each flight time progressing five seconds in duration; first flight ten seconds. Unlimited throws.

Round 2 - Total time with two minute max. per flight in an eight minute window. Unlimited throws.

Round 3 - Three longest flights with three minute max. per flight in an eight minute window. Unlimited throws.

Round 4 - Two, three and four minute flights in any order in a ten minute window. Unlimited throws.

Round 5 - Total time with three minute max. per flight in an eight minute window. Unlimited throws.

Round 6 - Five longest flights with two minute max. per flight in a ten minute window. Limited to six throws.

Sunday:

Round 7 - Most flight time from increasing duration flights, first flight minimum of fifteen seconds. For flights to count, they must exceed duration of previously credited flight. Eight minute window with unlimited throws.

Round 8 - Three longest flights with four minute max. per flight in a ten minute window. Unlimited throws.

Round 9 - Total time with three minute max. per flight in a ten minute window. Unlimited throws.

Round 10 - Four longest flights with two minute max. per flight in an eight minute window. Unlimited throws.



Jim Thorne's interesting ring-wing ship. Didn't compete, but it is unusual. Jim was very candid in stating that it needs considerably more work to be viable, but you've got to admit that it's pretty gutsy in today's very conservative design environment.



Airworks Epsilon on final approach. This design has gained great popularity recently due to excellent flight performance and exceptional quality exhibited in its workmanship; it's one of the highest quality ARF format planes available.



Mark Navarre & his D.J. Aerotech Wizard.

Championship Fly-Off rounds (top ten scoring pilots from first ten rounds):

Round 11 - Four one minute flights in a five minute window. Limited to four throws.

Round 12 - A two minute, three minute and four minute flight in any order in a ten minute window. Unlimited throws.

Round 13 - Five longest flights with two minute max. per flight in a ten minute window. Limited to six throws.

Most of the traveling pilots began to trickle in on Friday for practice at the TPG's Poway Flight Center to examine the lay of the land and explore its many and varied features. Poway is a unique site for many reasons and has several interesting and lift producing features for the savvy flier. The eastern edge of the field is bordered by a high tree line that can produce 'slope' lift in windy conditions, as well as being a ground feature to break thermals loose on calmer days. To the southeast, and a few hundred yards from the edge of the field, is a hill of considerable

height, which can also produce very good slope lift in onshore wind conditions and is frequently taken advantage of in windy conditions. To the field's north and northeast sides are residential areas who's roofs are powerful thermal generators. And finally, on the very best days, there's the valley to the west, which pipes powerful thermals straight into the heart of the field. Barring rain, there's almost no set of conditions that can prevent the Poway field producing suitable conditions for handlaunch flying.

Friday's practice flying day saw cloudy and cool conditions with only light thermal lift and surprisingly little wind activity. Saturday followed suit, and light planes were the order of the day. Saturday's morning conditions were particularly challenging with very flat air. The afternoon brought some light breezes with the overcast keeping thermals light and widely spread. If you hooked up in a good bubble this day, you had best stick with it, as it may be the last you would be able to



Joe Wurts has the most explosive launch style of anyone I've seen. Notice good follow through of throwing hand and straight arm. By keeping the elbow locked in the throw, he can get maximum leverage from his small build to transfer energy to the plane. Look close; both his feet are off the ground on this launch!



Gordon Jennings' more conventional throwing style. Gordon's larger frame makes this an effective and physiologically comfortable method to achieve good launches.

take advantage of for that round. It's days like these that really separate the wheat from the chafe, and leave the less experienced scratching their heads as they watch the gods of lift take advantage of almost impossibly light air.

Sunday, things began to look a little more like the usual Southern California climate, with scattered clouds and strong thermal activity. Along with the big boomers came the inevitable strong sink that yields round-killing, off-field landings; pilots would scratch to hook up and stay cored. Some of the pilots began to shift to heavier wing loadings to penetrate the quite breezy conditions, and locate the strong lift blowing through. Dust devils would occasionally blow through the field and one actually uprooted Mark Navarre's shade canopy for a few second's duration flight.. Forget about 'hat suckers', some of these were tent suckers! By the end of ten rounds of flying, the following competitors and their scores were eligible for the final three fly-off rounds:

1. Daryl Perkins
9912.07
2. Joe Wurts
9895.23
3. Gordon Jennings
9655.00
4. Fred Mallet
9546.49
5. Paul Naton
9541.35
6. Larry Jolly
9533.92
7. George Joy
9525.26
8. Steve Cameron
9334.00
9. Ben Clerx
9165.66
10. Jim Pearson
9142.26

And so it was, these ten men went on to the final rounds. Round 11 started with cloud cover and a good bit of wind, making the cumulative, increasing flight time task a game of strategy in light lift. By the next round, the thermal lift was beginning to really happen as the skies cleared a little to broken cloud cover, and the winds began to abate. The northeast end of the field began pumping up strong and closely spaced bubbles which served to start making scores very close. Finally, Round 13 started with about seven tenths cloud cover and a return to spotty lift. This was where man and machine were put to the ultimate test under the highest pressure; game faces were seen all



Paul Naton launching his Climmax PF. Paul is also a taller, higher leverage body type that works well with the 'football' style throw. Also notice his transmitter hand actuating a launch pre-set switch as he throws; Paul flies his planes balanced very far aft and the pre-set prevents tucking in the high-speed launch profile.



around. By the time the dust cleared, Daryl had maintained his undisputed status as IHLGF Champion with his consummate skills over a host of tough competitors - Congratulations, Daryl! The final standings were as follows, as well as what they flew:

1. Daryl Perkins; 12805.08; Aileron Maple Leaf (RG-15) by Don Peters (who's NOT Canadian!)
2. Joe Wurts; 12679.82; Aileron Epsilon by Airworks (Fred Mallet)
3. Gordon Jennings; 12181.68; Aileron Epsilon
4. Larry Jolly; 12174.03; Flinger (own design polyhedral)
5. Fred Mallet; 12164.20; Aileron Epsilon
6. George Joy; 12074.08; Poly /flap Epsilon
7. Paul Naton; 11994.65; Climmax PF

Charlie Richardson launches his Climmax PF. Charlie's long build allows him to achieve good launch heights even with a very casual throwing style.

R/C Soaring Digest

8. Steve Cameron; 11852.14; Orbiter 95 (modified)
9. Ben Clerx; 11596.49; Converted Russian freeflight airframe
10. Jim Pearson; 11072.28; Sunspot

This year's event was expertly CD'd by Steve Condon, with able assistance from brother Dave Condon. Computerized scoring at the site was handled by Cathy Jennings and Jo Joy; registration duties were performed by Laurie Condon and Jo Joy; the transmitter impound was manned by Lee Burke, Rich Mazak, Jason Gibson and Steve Pack; field judging was overseen by Steve Neu, Ed Whyte, Joey Chess, Greg Cameron and Bob Hayes along with field assistant Walter Gorecki. The raffle was operated by raffle chairman Ron Scharck with help from Jairo (Hidel) Alzate and Michael Blott. Great job, folks!

Sunday's raffle sponsors included: Airtronics (primary

'97 IHLGF Champion Daryl Perkins. For yet another year, the title remains in this talented pilot's incredible list of victories. Phil Lontz photo.

September 1997



Epsilon designer Fred Mallet. Here's another guy that unloads energy in a quick burst of power much like Wurts. Good physical conditioning is important to prevent injury with this throwing style, and also requires an aircraft capable of sustaining high momentary launch loads. Fred and Joe's launches are always audible!



event sponsor), Futaba Corp. of America, C.R. High Performance Aircraft, D.J. Aerotech, Northeast Sailplane Products, Slegers International, Dave's Aircraft Works, MM Glider Tech, Sig Manufacturing, Discount Hobby Warehouse, Hitec RCD Inc., Hobby Shack, Aerospace Composite Products, Bob Smith Industries, Composite Structures Technology, Pacer Technology, Point Loma Seafood, Round Table Pizza, Sky Shine and Sailplane & Electric Modeler Magazine.

Personally, I'd like to thank John Roe for volunteering his services to me as a correspondent and giving me access to his competitor's perspective. For information on next year's IHLGF, contact the Torrey Pines Gulls through Ron Scharck, 7319 Olivetas Avenue, La Jolla, CA 92037, (619) 454-4900. Planning for next year has already begun.

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How to Hold a Hand Launch Glider Contest in Central Indiana

...by Adam (RED) Weston
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Lafayette, Indiana 47904
aweston@ecn.purdue.edu
Photography by John Fize!

The five important requirements for a hand launch glider contest are: a flying field, prizes, participants, a scoring system, and good weather.

A flying field was easy. Purdue's Research Foundation maintains a good deal of land around West Lafayette, until they decide to develop it or turn it into yet another golf course. The Research Foundation keeps our 40 or so acre field nicely mowed, probably to encourage perspective buyers, and we are very grateful.

Next, I had to find door prizes to encourage competitors out of their basements. This aspect was surprisingly easy. Over the last year, I've kept pretty close contact with Joe Hahn of DJ Aerotech. They were more than willing to supply Wizard and Chrysalis kits as prizes. I then faxed Sig Manufacturing Company my contest flyer. They quickly turned around and sent a whole box of goodies right to my doorstep. The most exciting item from Sig, the set of four pop can cozies (insulators). Finally, I canvassed the local hobby store, Hobby Time, and did quite well. Their big contribution being a Dodgson Pivot, and some Guilows stick gliders to be given to the younger spectators. I had enough prizes for something for everyone, so now I needed competitors.

The Greater Lafayette Sailplane Guild



CD Adam Weston launching his Monarch C.



Rick and Paul Griebenow doing Chrysalis field repairs.

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Ron Smith exploring the Indiana jungle.



Cal Posthuma intently lining.

(GLSG) has about 10 members, depending on if school is in session or not. Of the 10, 6 are HLG fliers, a

good percentage, but not quite a full fledged contest. There are typically about five HLG contests in the entire region, so I felt a larger draw was possible. First, I worked the attendees of the Toledo Weak Signals Show, and what a show it was. However, I visited the 3 glider oriented booths in the first half hour; it seems thermal duration hasn't quite caught on around here. Then again, flush toilets are still a bit of a novelty, too.

So, my next move was to the Internet. I drew up a web page (<http://widget.ecn.purdue.edu/~aweston/hlgcomp.html>), utilizing some of my own scanned in shots, as well as some borrowed from DJ Aerotech's WWW page, masterfully maintained by Mike Welch (<http://www.bright.net/~djwerks>). Then, I sent a couple of postings to RCSE, great if you're trying to get competitors from New Zealand to attend, and tell you whether you should circle clockwise or counter-clockwise in your thermal turns. Finally, I made phone calls and sent flyers to club contacts all over the region.

Back during my pattern days (Yes, I used to put noisy coffee grinders on the front of my planes, but I sought counseling and now don't fly them more than once or twice a month), the necessary scoring calculations required at least an extra person to do the math, if not a whole computer system! I wanted to avoid this, and found the solution in Paul Siegel's Cincinnati IRS, or Immediate Results Scoring (RCSID February 1997). I did have one improvement; I hated using clunky clipboards to write on the golf like score cards. You constantly have to flip from side to side of the card. So I thought an integral board/card combo would be great. Scrap 3/16" plastic, which was easy to cut with the bandsaw, was utilized. The cards were sized

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Chuck Anderson, P. O. Box 305, Tullahoma, TN, 37388 Phone 615-455-6430

to be one half of an 8.5x11 sheet of paper. I reproduced a mess of these, and then 3m 77'ed them front and back to the 5.5x8.5 plastic. I figure I can mount new score cards on top of the old ones for the next contest.

Finally, the weather. Typically, West Lafayette weather is, "Wait a minute, and it will change." So, as the contest grew nearer and the forecasts became bleaker, I knew not to fret, it would change. The last forecast before I went to bed was for cloudy with a 40 percent chance of rain. So, I woke to an overcast sky and a damp field, but no precipitation. And that's how it stayed for the duration of the contest. All the rain stayed about 20 miles east of us, in one of the strangest patterns I've seen. Moral of the story? Order your weather early, and don't hold a contest during one of the rainiest Mays ever recorded.

Unfortunately, most of the perspective participants were coming from the east, where it rained all day long. Facing a 150-200 mile trip, one doesn't typically leave, unless they are certain of flying. The eventual turn out was 12, with locals, a bunch from Ohio, some from Michigan, and a pair from St. Louis. As I mentioned, TD pilots are spread a bit thin in the Midwest.

During the contest, the new DJ Aerotech Monarch D's were starting to show this improved version's superiority. The D's would end up taking the top four spots. Pilots or planes? Tough to say, but they were definitely launching higher. Another star was local pilot, Paul Griebenow. 11 year old Paul, with his dad Rick, and others launching for him, really impressed everyone. Look out you big shots out there; this guy can find and read lift with the best of us, and he's only been at it four months. Ultimately, he won the Wizard kit in the raffle and will be upgrading his Chrysalis, soon.

With the heavy cloud cover, the thermals weren't in abundance, but the easterly winds (very unusual) provided some slope lift. Of course, being in central Indiana, the closest thing we have to a slope is the factory building next to the flying field. The 40 foot vertical walls provided great lift, but the threat of ending up stuck on the

roof was a constant danger. By the end of the contest, 3 planes had ended up caught in the rotor and made 'landings' on the 'back of the slope'. However, the helpful factory employees were kind enough to go up on the roof and throw them off. For the first rescued plane, the pilot was there to fly it down; the second time he wasn't; and, the factory guy thought they just flew themselves down and went right to the pilot. The free-flighted plane was well trimmed and only suffered minor damage. After the 3rd hang up, the factory was labeled off limits.

In the end, the contest was a success. The king butterfly, Joe Hahn, ended up in 1st, with Chris Oster, Paul Siegel, and Terry Hahn rounding out the top 4. All were flying early production Monarch D's. I can't wait to get my hands on one! Young Paul ended up on the roof one round, which dropped him to tenth. Best finish for their first contest honors went to another local, Ron Smith. Ron is just returning to the hobby, and I think learned a lot from the helpful, experienced guys. Personally... Did I mention how well organized the contest was? ■

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R/C Soaring Resources

These contacts have volunteered to answer questions on soaring sites or contests in their area.

Contacts & Soaring Groups - U.S.A.

Alabama - North Alabama Silent Flyers, Ron Swinehart, 8733 Edgell Dr. SE, Huntsville, AL 35802; (205) 883-7831.

Alabama - Central Alabama Soaring Society, Ron Richardson (Tres.), 141 Boradmoor Ln., Alabaster, AL 35007; e-mail: <richardson@wwisp.com>.

Alabama - Southern Alabama & NW Florida Aerotow, Asher Carmichael, (334) 626-9141, or Rusty Rood, (904) 432-3743.

Arizona - Central Arizona Soaring League, Iain Gilthero, (602) 839-1733.

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

Arkansas - Northwest Arkansas Soaring Society, Tom Tapp (President), RT 2 Box 306, Huntsville, AR 72740; (501) 665-2201, eve.

California - California Slope Racers, John Dvorak, 1063 Glen Echo Ave., San Jose, CA 95125; (408) 287-0375.

California - Inland Soaring Society, Robert Cavazos, 12901 Forman Ave., Moreno Valley, CA 92553, RCAV@aol.com.

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

California - South Bay Soaring Society, A.J. Angelo, P.O. Box 2012, Sunnyvale, CA 94087; (415) 321-8583, fax (415) 853-6064.

California - Southern Calif. Electric Flyers, John Raley (President), 13751 Logan Ave., Costa Mesa, CA 92626; (714) 641-1776 (D), (714) 962-4961 (E), e-mail: E-Flyer@ix.netcom.com.

California - Torrey Pines Gulls, Ron Scharck, 7319 Olivetas Ave., La Jolla, CA 92037; (619) 454-4900.

Colorado - Rocky Mountain Soaring Assn., Phil Weigle, 1290 Salem St., Aurora, CO 80011, (303) 341-9256 eve.

Eastern Soaring League (VA, MD, DE, PA, NJ, NY, CT, RI, MA), Jack Cash (President), (301) 898-3297, e-mail: bacldcas@aol.com; Bill Miller (Sec./Tres.), (609) 989-7991, e-mail: JerseyBill@aol.com; Michael Lachowski (Editor), 448 County Rt 579, Milford, NJ 08848, e-mail: mikel@airage.com.

Florida - Florida Soaring Society, Mark Atzel (President), 1810 SW Terrace, Ft. Lauderdale, FL 33312, (954) 792-4918.

Florida (Central) - Orlando Buzzards Soaring Society (www.specs-usa.com/~ingo/OrlandoBuzzards), Don Cleveland (Pres.), 1515 Cuthill Way, Casselberry, FL 32707, (407) 696-7516, <Dcleveland@aol.com>.

Georgia - North Atlanta Soaring Association, Tim Foster, (770) 446-5938 or Tom Long, (770) 449-1968 (anytime).

Hawaii - Maui Island Slope Soaring Operation, MISO, Hank Vendiola, 10-C Al St., Makawao Maui, HI 96768; (808) 572-5283.

Illinois (Chicago Area) - Silent Order of Aeromodelling by Radio (S.O.A.R.), Jim McIntyre (contact), 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744. Bill Christian (contact), 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (708) 259-4617.

Illinois (Northwest) - Valley Hawks R/C Soaring Club, Jeff Kennedy (President), 414 Webster St., Algonquin, IL 60102, (708) 658-0755, eve. or msg.

Iowa - Eastern Iowa Soaring Society (Iowa, Illinois, Wisconsin, Minnesota), Bob Baker (Editor), 1408 62nd St., Des Moines, IA 50311; (515) 277-5282.

Indiana - Bob Steele, 10173 St Joe Rd., Fort Wayne, IN 46835; (219) 485-1145.

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

Kansas - Aerotowing, Jim Frickey, (913) 585-3714.

Kentucky - Bluegrass Soaring Society, Frank Foster (President), 4939 Hartland Pkwy., Lexington, KY 40515; (606) 273-1817.

Kentucky - Louisville Area Soaring Society, Ed Wilson (Contact), 5308 Sprucewood Dr., Louisville, KY 40291; (502) 239-3150 (eve), e-mail: <ewilson@bellsouth.net>.

Maine - DownEast Soaring Club (New England area), Steve Savoie (Contact), RR#3 Box 569, Gorham, ME 04038; (207) 929-6639. InterNet e-mail <Jim.Armstrong@juno.com>.

Maryland - Baltimore Area Soaring Society, Russell Bennett (President), 30 Maple Ave., Baltimore, MD 21228; (410) 744-2093.

Maryland & Northern Virginia - Capital Area Soaring Association (MD, DC, & Northern VA), Chris Bovais (Coordinator), 12504 Circle Drive, Rockville, MD 20850; (703) 643-5513.

Michigan - Greater Detroit Soaring & Hiking Society, Greg Nilsen (Sec.), 2163 Highspine Dr., Rochester Hills, MI 48307; (810) 651-8598, CNilsen62@aol.com.

Michigan - Great Lakes 1.5m R/C Soaring League & "Wings" Flight Achievement Program & Instruction, Ray Hayes, 58030 Cynus Lane, Washington, MI 48094; (810) 781-7018.

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

Missouri - Independence Soaring Club (Kansas City area, Western Missouri), Edwin Ley (Contact), 12904 E 36 Terrace, Independence, MO 64055; (816) 833-1553, eve.

Missouri - Mississippi Valley Soaring Assoc. (St. Louis area), Peter George, 2127 Arsenal St., St. Louis, MO 63118; (314) 664-6613.

Nebraska - B.F.P.L. Slopers, Steve Loudon (contact), RR2 Box 149E1, Lexington, NE 68850; (308) 324-3451/5139.

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

Nebraska - Ken Bergstrom, R.R. #1, Box 69 B, Merna, NE 68856; (308) 643-2424, <cabergst@neb-sandhills.net>.

Nevada - Las Vegas Soaring Club, Jim Allen (President), 7117 Caprock Cir., Las Vegas, NV 89129; ph (702) 658-2363, fax (702) 658-1998.

New Jersey - Vintage Sailplane R/C Association, Richard G. Tanis (President/Founder), 391 Central Ave., Hawthorne, NJ 07506; (201) 427-4773.

New York, aerotowing Rochester area, Jim Blum and Robin Lehman, (716) 367-2911.

New York - Elmira - Harris Hill I./D R/C, aerotowing & slope, John Derstine, (717) 596-2392, e-mail 2076482@mcimail.com.

New York, aerotowing Long Island Area, Robin Lehman, (212) 744-0405.

New York - (Buffalo/Niagara Falls area) - Clarence Sailplane Society, Lyn Perry (President), (716) 655-0775; e-mail perrylls@staff.sunverie.edu; Jim Roller (Competition Coordinator), (716) 937-6427.

New York - Long Island Silent Flyers, Stillwell Nature Preserve, Syosset, NY, Taylor Fiederlein (President), (516) 922-1336, or Joe Coppola (VP), (516) 798-1479.

New York - Syracuse area, Central NY Sailplane Group, Dave Zintek, Minoa, NY, (315) 656-7103, e-mail Zintek@aol.com.

North Carolina - Aerotowing, Wayne Parrish, (919) 362-7150.

Northwest Soaring Society (Oregon, Washington, Idaho, Montana, Alaska, British Columbia, Alberta), Sandie Pugh (Editor - NWSS Eagle), 1119 SW 333rd St., Federal Way, WA 98023, e-mail: parrot2luv@aol.com, (206) 874-2429 (H), (206) 655-1167 (W).

Ohio - Cincinnati Soaring Society, Chuck Lohre, 3015 Beaver Ave., Cincinnati, OH 45213; (513) 731-3429, lohrc@iac.net, http://www.iac.net/~lohre.

Ohio - Dayton Area Thermal Soarers (D.A.R.T.S.), Walt Schmoll, 3513 Pobst Dr., Kettering, OH 45420, (513) 299-1758.

Ohio - Mid Ohio Soaring Society (MOSS), Hugh Rogers, 888 Kennet Ct., Columbus, OH 43220, (614) 451-5189, e-mail tomnagel@freenet.columbus.oh.us.

Oklahoma - Central Oklahoma Soaring, George Voss, (405) 692-1122.

Oklahoma - Tulsa R/C Soaring Club (TULSOAR), http://www.mccserv.com/tulsoar

Oregon - Portland Area Soaring Society (PASS), Pat Chewning (Secretary), 16766 NW Yorktown Dr., Beaverton, OR 97006, (503) 645-0323, e-mail: patch@sequent.com, web page: www.europa.com/~patch/

Oregon - Salem Soaring Society, Al Szymanski, (contact), (503) 585-0461, aszy@teleport.com, www.teleport.com/~aszy/sss.html

Oregon - Southern Oregon Soaring Society, Jerry Miller, 3431 S. Pacific Hwy., TRLR 64, Medford, OR 97501, e-mail Milljer@aol.com, ph/fax (541) 535-4410.

Tennessee - Memphis Area Soaring Society, Bob Swower, 1610 Saddle Glen Cove, Cordova, TN 38018, (901) 751-7252, FAX (901) 758-1842.

Tennessee - Tullahoma (Southern Middle Area), Coffee Airfoilers, Herb Rindfleisch, 106 Inglewood Circle, Tullahoma, TN 37388, (931) 455-1836, <herb@cafes.net>.

Tennessee - Soaring Union of Nashville, Terry Silberman, PO Box 17946, Nashville, TN 37217-0946, (615) 399-0846.

Texas - aerotowing, Dallas area, Andrew Jamieson, 9426 Hillview, Dallas, TX 75231, (214) 349-9346, e-mail ajsleep@aol.com. Larry Sengbusch, (972) 291-4840.

Utah - Intermountain Silent Flyers, Tom Hoopes, (801) 571-3702 (eve), "Come Fly With Us!"

Virginia - Tidewater Model Soaring Society, Herk Stokely, (757) 428-8064, herkstok@aol.com.

Virginia - Appalachian Soaring Association, Virginia's Southwest (Bristol area), Greg Finney, 106 Oakcrest Circle #5, Bristol, VA 24201; (540) 645-5772, e-mail <gfinney@naxs.com>.

West Virginia - Clup Vignolini, 1305 Perry Ave., Morgantown, WV 26505; (304) 598-9506, <cydne30a@prodigy.com>.

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

Wisconsin - Valley Aero Modelers, Lee Murray, 1300 Bay Ridge Rd., Appleton, WI 54915; (414) 731-4848, <74724.65@compuserve.com>.

Outside U.S.A.

Australia - Southern Soaring League, Inc., Mike O'Reilly, Model Flight, 42 Maple Ave., Keswick SA 5035, Australia. Phones: ISD+(08)293-3674, ISD+(08)297-7349, ISD+(018) 882-156 (Mobile). FAX: ISD+(08) 371-0659.

Canada - Greater Niagara Area Thermal Soarers (GNATS), Flat Field Soaring & Aerotowing, Gerry Knight, (905) 934-7451 or Don Smith, (905) 934-3815.

Canada - MAAC Men Gliding Club, Jim Holland, 168 Verona Dr., Winnipeg, Manitoba, Canada R2P 2R8, (204) 697-1297.

Canada - Southern Ontario Glider Group, "Wings" Programme, dedicated instructors, Fred Freeman, (905) 627-9090, or Bill Woodward, (516) 653-4251.

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

England (southwest) - Sean Walbank, Woolcombel Hays, Melbury Bubb, Dorchester, Dorset, DT2 0NJ, phone 01935-83316.

Hong Kong - Robert Yan, 90 Robinson Road, 4th floor, Hong Kong; (852) 25228083, FAX (852) 28450497, yan@asiaonline.net.

Japan - Dr. Paul "Sky Pilot" Clark, 2 - 35 Sulkoren Cho, Hirakata Shi 573, Osaka Fu, Japan; IAC+(81) 720-41-2934, fax: IAC+(81) 6-954-4144, e-mail: 76055.3546@compuserve.com, http://chaos.fullerton.edu/~jclark/skypilot.

Scotland - Ron Russell, 25 Napier Place, South Parks, Glenrothes, Fife, Scotland KY6 1DX; Tele. # 01592 753689.

Seminars & Workshops

Free instruction for beginners on construction & flight techniques, week-ends (excl. contest days), "A" Angelo, South Bay Soaring Society (San Jose area), (415) 321-8583.

BBS/Internet

Internet - Email list/resource of RC soaring related folks, including US and international club contacts, vendors, kit manufacturers/distributors, software, equipment and supplies. Check out the web site: www.ncpapsych.com/yellow.htm, or contact Manny Tai at taucm@kaiwan.com.

Internet soaring mailing listserve linking hundreds of soaring pilots worldwide. Send a msg. containing just the word "subscribe" to soaring-request@airage.com. The "digestified" version that combines all the msgs. each day into one msg. is recommended for dial-up users on the Internet, AOL, CIS, etc. Subscribe using soaring-digest-request@airage.com. Post msgs. to soaring@airage.com. For more info., contact Michael Lachowski at mikel@airage.com.

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Reference Material

"Summary of Low-Speed Airfoil Data - Volume 1" & "Volume 2", Michael Selig wind tunnel testing results. Cost for each: \$25 USA (includes postage), \$29 surface outside USA, \$31 air Western Hemisphere, \$38 air Europe, \$42 air all other countries. Computer disk, ascii text files (no narrative or illustrations), is \$15 in USA; \$16 outside USA. Source for all "SoarTech" publications, also. Contact Herk Stokely, 1504 N. Horseshoe Cir., Virginia Beach, VA 23451. Phone (757) 428-8064, email: herkstok@aol.com.

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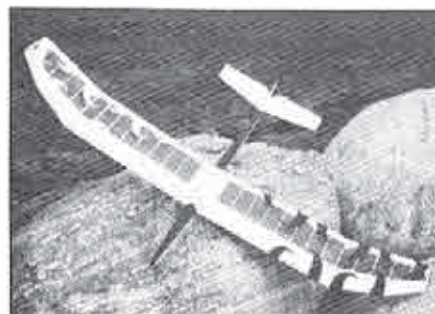
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