March, 1999
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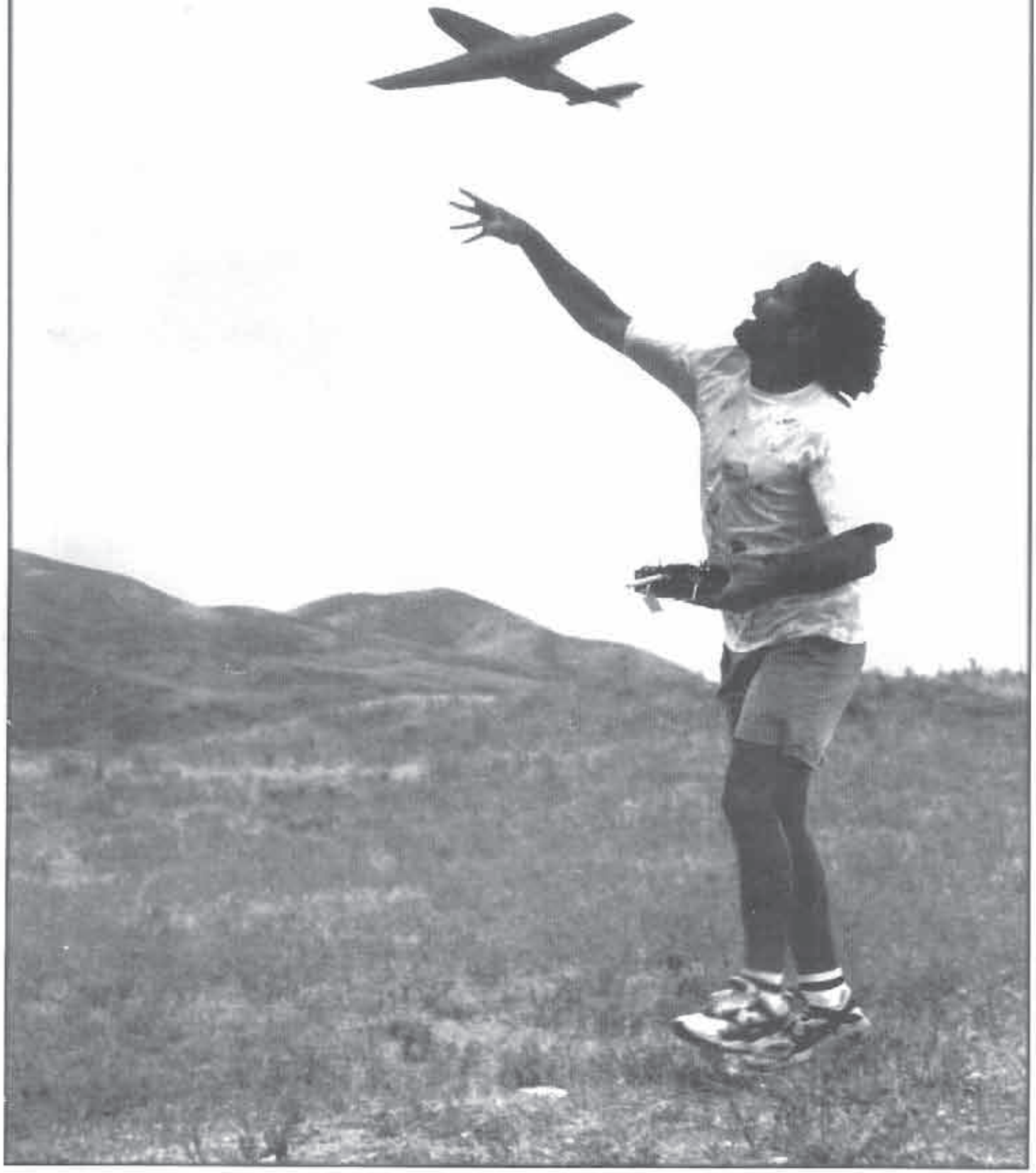
R/C SOARING DIGEST

Radio controlled

THE JOURNAL FOR R/C SOARING ENTHUSIASTS



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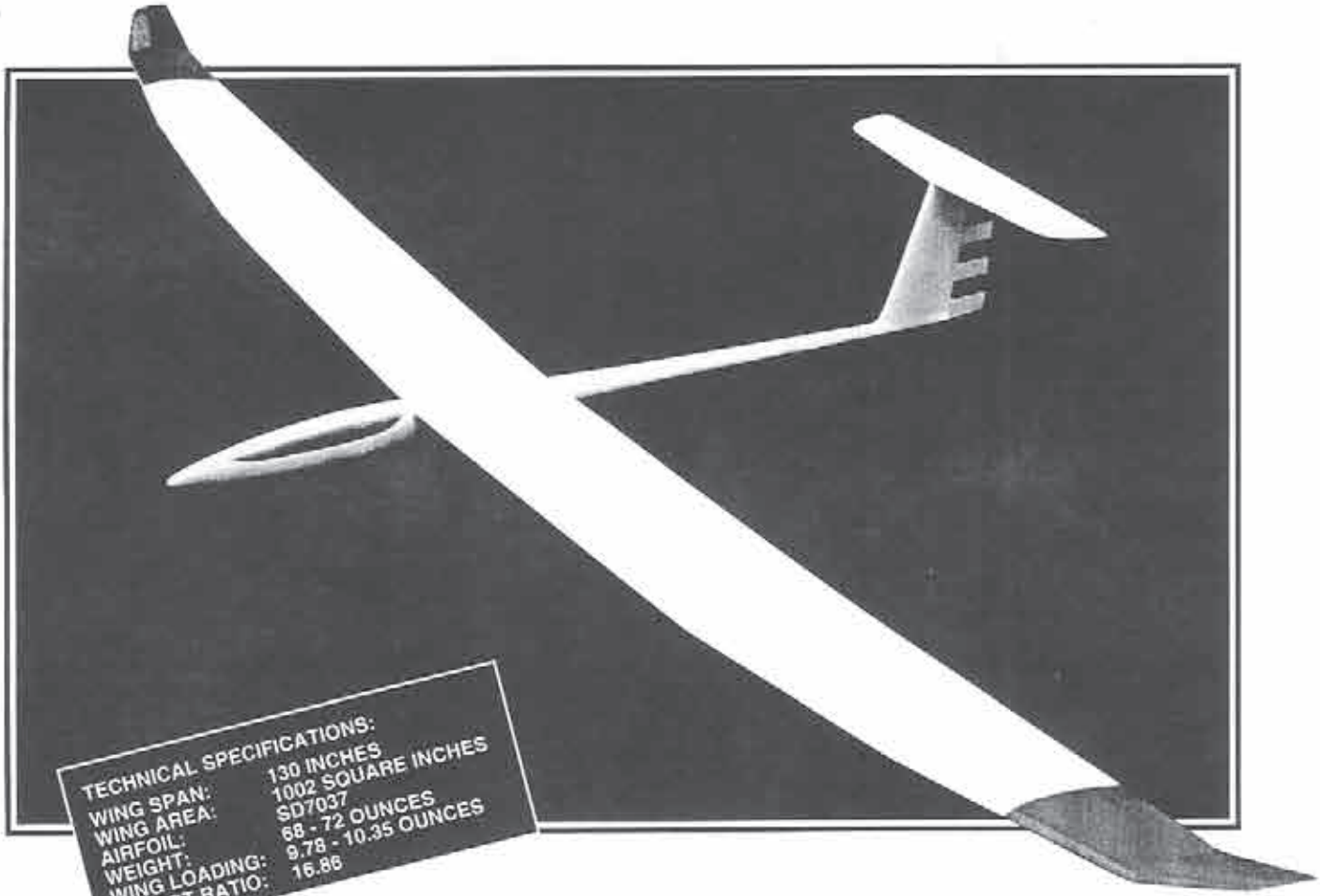

TECHNICAL SPECIFICATIONS:

WING SPAN:	130 INCHES
WING AREA:	1002 SQUARE INCHES
AIRFOIL:	SD7037
WEIGHT:	68 - 72 OUNCES
WING LOADING:	9.78 - 10.35 OUNCES
ASPECT RATIO:	16.86

This fine kit features include:

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- Pre-fitted Canopy with wire hold down installed.
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- Stab Tips and Leading Edge sanded and attached.
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- Wing Tips and Leading Edges finished and attached.
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R/C Radio controlled SOARING DIGEST
THE JOURNAL FOR R/C SOARING ENTHUSIASTS

WILD ABOUT SAILPLANES?

Wild man Fred Mallett, Corpus Christi, Texas, is launching a CAB Designs P-51 into storm driven winds.

Photo courtesy of Fred Mallett.

R/C Soaring Digest (RCSD) is a reader written monthly publication for the R/C sailplane enthusiast and has been published since January, 1984. It is dedicated to sharing technical and educational information. All material contributed must be exclusive and original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of all articles, model designs, press & news releases, etc. are the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author. *RCSD* was founded by Jim Gray, lecturer and technical consultant. He can be reached at: 210 East Chateau Circle, Payson, AZ 85541; (520) 474-5015, <jimpeg@netzone.com>.

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Artwork
Gene Zika is the graphic artist who designs the unique ZIKA clip art.

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Having Fun

The cover shot of Fred Mallett says a lot. He's obviously having fun, which is what this hobby is all about. In fact, he was having so much fun, he can't tell us who caught him in the act. Our apology to the photographer; it might be Fred's wife!

Address Change

Eric Sanders has moved. His CompuFoil ad, in this issue, includes the old address. The new address is 7682 Winfield Dr., Brighton, MI 48116; phone/fax (810) 225-1165; e-mail <eric@compufoil.com>, <www.compufoil.com>.

Happy Flying!
Judy & Jerry Slates

(Left) The finished Pilatus B-4. (Below) The real thing! Pilatus B-4 photo taken at Vacaville Gliderport in Vacaville, California, by Jerry Slates.

Building Along The Pilatus B-4

In October, 1998, Jerry Slates started building the 1/5 scale Pilatus B-4. Photographs depicting more detail, and in color, can be viewed at the *RCSD* web site; they're intended as an aid for those that are also building along.

A Bit of History

The full-size Pilatus B-4 is a popular, all metal, single seat, standard class sailplane, suitable for pilots who have finished solo flight, due to the simple handling characteristics. More experienced pilots also appreciate its good performance. The first flight of the B-4 prototype, designed as a private venture by Ingo Herbot, was in 1966. Pilatus, of Switzerland, took over, developed the B4-PC11, and its first flight was in 1972.

Current Plan Sources

Pilatus B-4, #MT 637-G
Bob Holman Plans
P.O. Box 741, San Bernardino, CA 92402
(909) 885-3959

Pilatus B-4, #MW2210
'98 - '99 Plans & Construction Guide
Traplet Publications, Ltd.
U.S.A.: (626) 836-6931
e-mail: general@traplet.co.uk
Web: http://www.traplet.co.uk

Jer's Workbench

Jerry Slates
P.O. Box 2108
Wylie, TX 75098-2108
(972) 442-3910
RCSDigest@aol.com

Pilatus B-4, Part VI

Last month, I completed all of the major construction on the Pilatus balsa wood, strip planked fuselage.

Once the sanding was complete, a single layer of .5 oz. fiberglass cloth was added to the fuselage and rudder. The cloth was applied with clear dope, followed by one extra coat, to give the fuselage a little bit of added strength. Plus, this also provided a better base for the paint job. How much paint did I use? Not very much...

A total of three coats of "Dupli-Color" were applied; I obtained the "Dupli-Color", a scratch filler and primer, from a local NAPA auto supply. I wet sanded with 400 and 600 wet/dry sandpaper between each coat, which removed most of the primer. Then, I applied a coat of "Red Devil", ultra high gloss, white appliance epoxy paint, obtained from a local home builder supply. Once done, the fuselage did not look like it had been constructed from balsa and strip planked, unless one looked inside the fuselage.

The rudder, stabilizer, and wings were covered with white "Top Flight" monokote; for trim, I used black and red "Top Flight" trim sheets. The stick-on numbers were obtained from a local art supply store.

Yes, the Pilatus B-4 is now complete! The gross ready to fly weight is 88 oz.; the wing loading is 14.6 oz. per square foot, which is not at all bad for a scale model.

Conclusion

One might ask, "Why would anyone want to build a model like this one from plans?" Well, for myself, I enjoy building. There is a certain amount of self satisfaction, knowing that I built the model from scratch. And, the cost? Generally speaking, a model such as this one can be built for about half of what a kit would cost.

Well, that's it for this project. Let's go fly; remember to keep your wing tips up! ■

"SHORT CUTS"

Steve Savoie
926 Gage St., Bennington, Vermont 05201
(802) 442-6959

U-2 Building Project, Part 4

Last month, the fuse plug was finally to shape and appeared to be a good representation of our 3 views. The next step was to glass over the Rohacell plug. This was done by pre-cutting strips of 3 oz. satin weave glass and a very tight 4 oz. plain weave glass. The 3 oz. was used for its drapeability and the 4 oz. for its bulk.

My better half assisted during this project as I quickly found out this was not a one person job. The fuse was suspended like a pig on a spit between two supports so that it could rotated as needed. My assistant wet out the glass on a lay out board, which was pre-sheeted with wax paper. West epoxy was used as well as a bondo type squeegee to uniformly saturate the glass. My first error was using the 3 oz. glass; it was much too flimsy and could easily be distorted when removed from the wax paper due to its type of weave. Two complete wraps of the fuse were made with the 3 oz. using staggered overlapping joints.

The 4 oz. then followed and was not as difficult to wrap as I thought it would be. Some darting (cuts in the glass) was required around the intakes, but this wasn't that bad. Were I to do it again, I would have used 4 oz. only. The Rohacell foam really sucked up the epoxy so, to keep things wet, the remainder of the epoxy was poured over the lay up and the entire assembly was slowly rotated to reduce drips. A little heat from the heat lamp also helped.

When the process was finished, it did not resemble the original foam plug; it was quite a mess and I thought that I had taken a big step backwards. A day later, the entire assembly, still a bit soft, but not tacky, was wrapped up in the old electric blanket and allowed to cook for 3 days. The lay up was now ready to sand. And boy did it get sanded. Eventually all the high spots were knocked down and it began to come back to shape though a bit rough.

I used 80 grit paper dry and picked up a semi-flexible sanding guide from the autobody shop. I did not wet sand because a few areas of the plug were not sealed yet and I didn't want to deal with water getting in the foam; Rohacell loves water. The next step was to begin filling and final shaping with bondo, which is nothing more than polyester resin with a filler, usually microspheres. I forgot how hard that stuff was to sand, but it was very similar to glass so sanding was uniform.

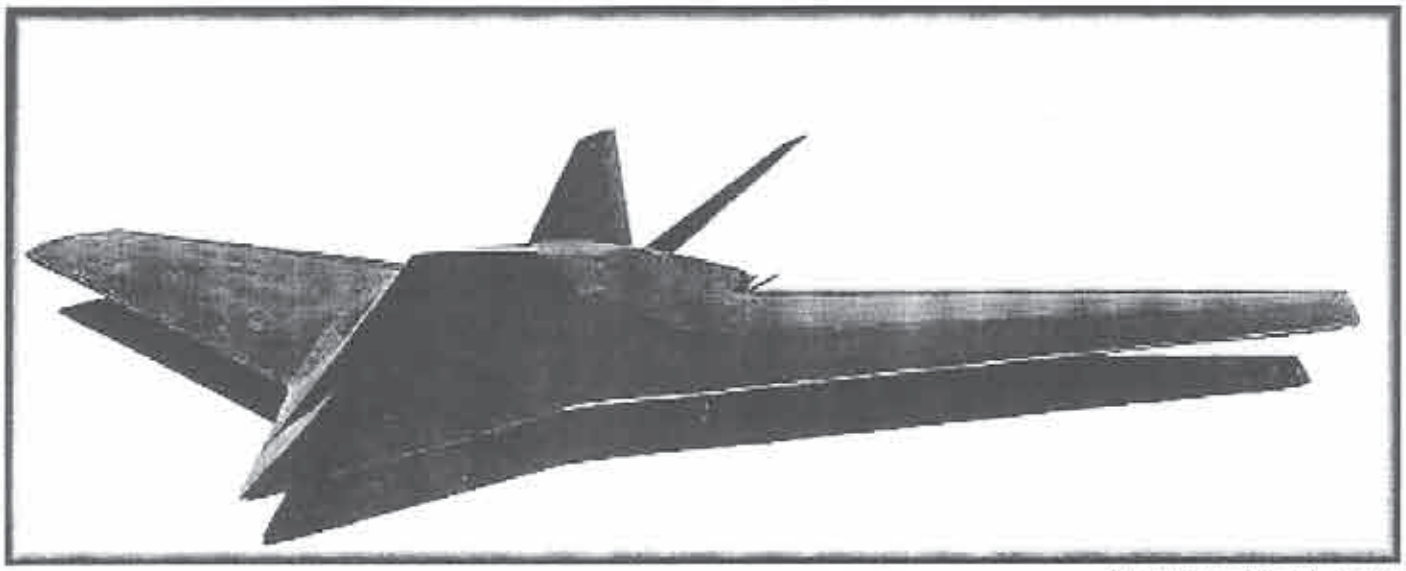
This process took up several half weekends and was quite messy, as well as stinking up the place a bit from the styrene in the bondo. (Yeah. Use in a well ventilated space when it's 15 degrees outside.) By the way, always use more creme hardener with the bondo than you think is required; if you put too much, you know it real quick, because it begins to thicken and spreading it is tough. If you mix in too little hardener you may have to wait a week for it to harden, sneaking it upstairs and out of the cold basement to help it cure while sitting over the radiator. (That's the heating register for you California dudes.) One week later, the bondo still balled when sanded and had a bit of a tack to it. The remedy was to scrape it off and start over again; remember, more is better.

A neat product I found at the autobody store was a product commonly called "Icing". This is a real creamy version of bondo and goes on like cake frosting, but even better. It has a hardener and cures in 5 minutes and sands in 15. This stuff sands great, is lighter than bondo and fills in all those little pits well. I would not recommend it for finishing a HLG fuse, but for a plug or larger sized scale fuse it works great. The Icing was skim coated over most of the fuse and sanded down to shape.

The plug is almost ready to paint with primer to help identify the few low spots left. I'll use a dark color to contrast with the off white color of the fuse, sanding all surfaces smooth and true. Any areas left with primer on them will need additional filling.

'Til next month! Will this sanding ever end?

■



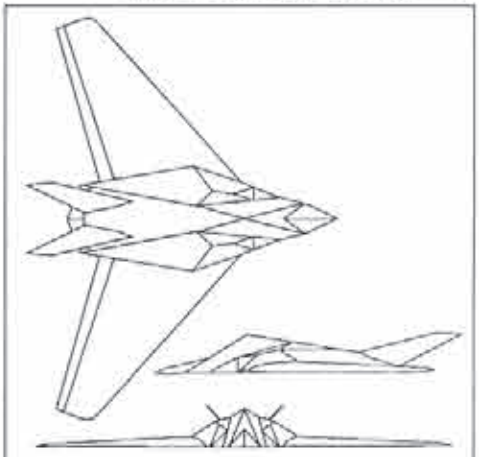
on the Wing

P.O. Box 975
Olalla, Washington
98359-0975
E-mail: bsquared@halcyon.com
http://www.halcyon.com/bsquared/

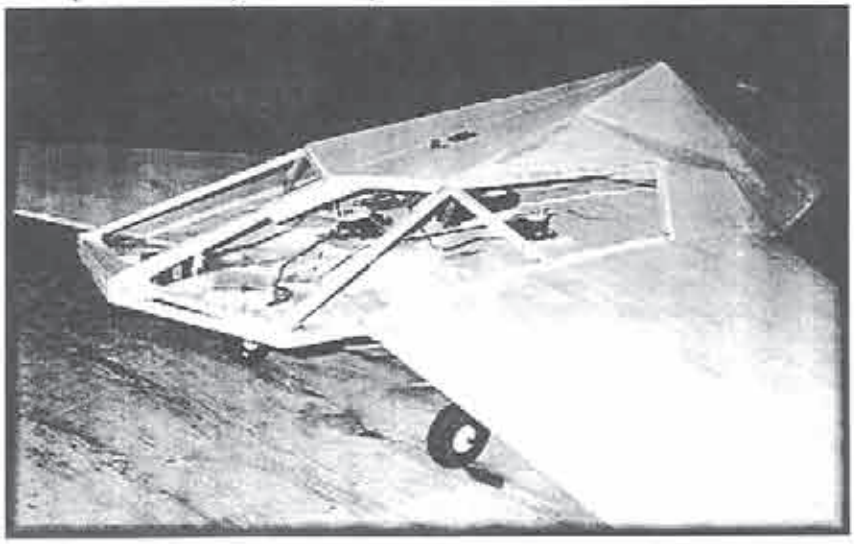
The model is controlled through a Radiant 6 radio system with five servos. The V-tail is non-moveable. Initially, it was set up using spoileron and flap functions, with a separate elevator. The elevator design incorporates a slot which is supposed to bring air from below the rear of the fuselage over the elevator surface, but in practice, this did not work well.

Henry flies with the Inland Slope Rebels. Fellow members Brian Laird and Carl Moss were very instrumental in getting this 'ship into the air. Several hand tosses at a gentle slope indicated the need for more weight in the nose and more reflex in the ailerons. Because the airfoil is pretty much a flat-bottomed section, it needs a lot of reflex in the trailing edge — about a half inch. Elevator authority was poor, and it was decided to use elevon function instead of aileron and elevator. When this decision was made, Henry disconnected the elevator servo and made the necessary

The completed model, sitting on the steerable retractable landing gear.



Henry Hester's Stealth Sloper



Henry's model under construction. The interior is still exposed, showing the servos and other control components.

Henry Hester's Stealth Sloper

Henry's Stealth sloper is based on the F-117, and is a study in determination. We first heard about this model from Henry, when he sent some photos of the underlying balsa structure to us via e-mail. A few days later we received pictures of the finished aircraft. The included three-view is the result of some great camera work.

The model is finished in flat black using dope and silkspan over balsa sheeting. This turned out to be a lot of work, but the photos show a beautiful model, indicating it was all worth the effort.

transmitter changes.

Up on a steeper grade, the model was launched into the wind and promptly looped. With Brian at the transmitter and Carl throwing, the model was thrown once more. This time it flew slightly left and out from the hill about 150 yards. Brian then banked it up into a climbing right turn. At that point cheers resounded from everyone present. Half a dozen turns later, Brian landed it below the crest of the hill due to insufficient lift on the slope. The entire flight was caught on video!

Henry's model has a span of 60 inches. It weighs four pounds 12 ounces, and has 1050 square inches of wing area, giving a wing loading of 10.4 oz/ft^2. This is reasonable for an all balsa tailless slope 'ship, given the large fuselage.

A final note. As you may have noticed from one of the photos, the model is set up with a tricycle landing gear. It's both retractable and steerable, and we wonder what future plans lie in store for the model.

If you have a tailless project or an unconventional design which you feel may be of interest to *RCSD* readers, please contact us at P.O. Box 975, Olalla, WA 98359-0975 or <bsquared@halcyon.com>.

■

TECH TOPICS

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Foam Cutting Techniques Jeff Naber, Pat McCleave & Jim Frickey

Last month, we wrapped up the equipment side of our series on foam cutting. In the meantime, a couple of questions came in on technique. While pondering those notes, the thought occurred that maybe it would be useful to hear some other opinions on the topic. So I asked three folks that I fly with from time to time to make some comments.

The panel of experts consists of Jeff Naber (TulSoar), Pat McCleave (Kansas Soaring Society) and Jim Frickey (KSS and TulSoar). Jeff has been cutting cores for a number of years and vacuum bags composite wings for himself and some of the guys in our club. Pat has been doing the same for as long as I've known him. Jim has a long history of putting together really well-crafted sailplanes and, along with his brother Mike, has been winning on the contest circuit for a number of years. (The Frickey brothers have headed up the excellent winch equipment at the Nats lately.)

What do these guys have in common? They all put together some of the best finished and highest quality wings in our area. Since a good wing starts with a good core, they seemed like naturals to try and answer some of the following questions:

1) How do you set the proper weight for cutting cores?
2) How do you set the proper temperature in the wire?
3) How do you clean up the 'angel-hair' after the cut?
4) Any other hints or ideas for folks starting out?

JEFF NABER

Jeff uses the FeatherCut system and CompuFoil to set up his templates and cut his cores. He has access to a CAD system through another TulSoar member (Jeff Droll) and takes the output from the CompuFoil program into the CAD system and water jet cuts templates from aluminum. Jeff suggests using the larger diameter (0.020") inconel wire supplied by Composite Structures Technology (http://www.cst.com) for the FeatherCut bow.

He modifies the CompuFoil template dimensions to allow about a 1" trailing edge spacer (or 'land' as referred to in last month's column) to catch the wire on the way out of the core. He also modifies the entry and exit to match the curvature of the airfoil at the point where the core starts and ends (similar to the 'tangent' entry mentioned last time).

Jeff starts his cut by setting up the system with the wire resting against the LE of the core. He then flips on the power supply (pre-set to the temperature he wants) and cuts the lower surface followed by the upper surface.

For wing cores, Jeff uses the standard weight in the FeatherCut system out at the end of the drop arm. For smaller stab cores, he'll move it in as much as halfway. He then adjusts the wire temperature to get the kind of cut and surface he's looking for. Jeff's suggestion is to set the temperature to cut very slowly. In his experience, if the wire is too hot it tends to sag back in the middle of the core and produces excess 'scalloping' at the TE.

The right temperature setting for Jeff is low enough to produce a pretty obvious amount of 'angel hair' on the surface of the core. If you're generating any sizzling or smoke, you're way too hot. If you're not making any angel hair, you're still cutting too hot. If you're making a little, you can probably drop the power setting a bit more. When you've got it right, the wire should pop out of the rear of the core almost simultaneously along the whole trailing edge (assuming you've got your ratio settings on the drop arm about right!).

So how do you get rid of the 'angel hair' without gouging the core? Jeff suggests rubbing it gently with your bare hand in a motion that moves from the center of the core towards the edge. Circular motion is not a good idea here. Using any type of sandpaper while rubbing off the majority of this material can scratch up the surface if you're not careful. If you're reluctant to use your bare hand, a light cotton glove, dusted off VERY frequently, will probably work pretty well.

PAT McCLEAVE

Pat also uses the FeatherCut system, but with some cutting wire he got from Charlie Richardson a few years ago (approximately 0.020" diameter). He varies the position of the weight somewhat, usually running it out at around 50% of the drop arm. He uses the position to fine tune the cut when working with a lot of taper in the core.

Pat's power supply is a Variac with a dial indicator to allow repeatability of the setting once he's got the temperature where he wants it. As with Jeff, Pat says that once you're getting a rather fine and uniform amount of angel hair, you've got it about right. Pat positions the wire at the LE on the template and then turns on the supply to start the cutting process.

To remove the angel hair, Pat uses 400 grit wet/dry paper (dry) and lightly runs it spanwise. After each pass, the excess material is removed from the sanding pad before sanding again. Sometimes Pat uses another piece of foam to remove the angel hair. With EPP this is almost a requirement.

Pat also uses CompuFoil with a straight in cut unless he's got a lot of curvature at the LE of the template. Then he'll angle it in a bit. He also extends the TE out between 1/2" and 1" to guide the wire out of the core. He puts a small 'notch' on the TE land to catch the wire and allow it to cool. His template material is 1/16" phenolic.

When the settings are right, he finds that the wire will exit along the entire TE at the same time (very little sag). With the advent of triple and quad taper wings, the length of cores is smaller than in the past. This makes it easier to get a good TE without any wire sag in the middle of the core.

Pat used to use 1/4" LE stock, but has switched to cutting closer to the LE, and then rounding off with a sanding block to match the LE shape. This area is wrapped with cloth before bagging for extra strength. On his ships, Pat will often use Spectra cloth for a nearly bullet-proof leading edge.

A point Pat emphasizes is to heat up the wire and burn off the excess foam between each cut. This is important to get consistent cuts each time and minimizes accumulation of scorched material which may groove the core or cause excess drag.

Pat also uses weights on his cores while cutting to keep them flat and lined up in the beds. Extruded foam, in particular, will stress relieve while being cut, and requires some weight to keep it flat during the entire process. Pat also emphasizes the need for a very flat, sturdy table to keep the cores as true as possible.

JIM & MIKE FRICKEY

Jim Frickey uses a home brew cutting system that uses a drop arm similar to a FeatherCut but with additional bearings to adjust the taper ratio for the core. The wire he uses is 0.016" diameter stainless steel. This particular wire is a high strength, aircraft safety tie wire, which can support a lot of tension for very 'sag-free' cuts. Comes in 1000 ft. rolls for ~ $11 at aircraft supply stores.

Jim uses phenolic for his template material. He will cut the template down by 1/32", then glue 1/32" ply on the surface, and sand to a smooth, polished finish. He sometimes has access to a CAD system for making templates from aluminum (preferred method when it's available). Templates are drawn by CompuFoil and Jim matches the curvature at the LE and TE of the core for a smoother entry and exit to the foam.

He uses the standard weight for a FeatherCut system and usually runs it out at the end of the arm. Jim pays very close attention to setting the wire ratio for tapered cores and will set it up and check it several times without the core to be sure he gets it right. Once the ratio is set, the core is added and the wire rests on the template at the LE before turning on the power supply to start the cut.

The power supply uses a Variac and the dial setting is noted for the correct temperature before setting up the core for the cut. Jim sets the temperature by cutting some scrap to get the speed and surface about right. Cutting time varies with the material used. Grey foam takes ~ 40 seconds for an 8" core and blue foam takes 20-25 seconds for the same chord. After each cut, the wire is cleaned with steel wool after it cools.

Jim gets very little 'angel hair' on his cores since he's gone to the small diameter stainless steel wire. Consequently, it only takes a light sanding to clean things up for vacuum bagging. With a careful setting on the drop arm ratio, he gets the wire to pop out at the TE pretty much along the whole length of the core at the same time. If the wire is too hot and the weight is pulling too

hard, some sag in the middle of the core will occur. So Jim looks to get the time about right, and then checks to be sure the wire exits the core cleanly and simultaneously all along the TE.

(DFR's comment on the wire thing: When I was using larger diameter chromel wire, I would get lots of angel hair on my cores. Since going to the fine diameter SS wire, and cutting at about the same speed as before, I now get very little of this material on the surface. So the appearance of angel hair is also tied in to the wire diameter, or surface finish, or something else known only to the foam-cutting gods.)

Summary

As you can see, the guys that do an excellent job with wings and cores each have slight variations on their themes. Some ideas they all have in common are:

1) Good quality templates with a reasonable land at the TE to guide the wire out.
2) Start the cut with the wire cold and resting at the LE. Then turn on the power and let gravity do the work for you.
3) Clean the wire after each cut.
4) Maintain good tension in the bow.
5) Cut fairly slow with no smoke or burning of the foam.
6) Set the weight at a fixed location (usually out at the end of the arm) and adjust the temperature to get what you want.
7) Angel hair is a pretty good indicator that you're cutting about right.
8) Typical time to cut through an 8" core is going to be between 30 seconds to a minute depending on the material you use and your preference in cutting temperature and weight.
9) Wire type may have an effect on the amount of angel hair on the core. The larger diameter inconel wires seems to produce more than the smaller diameter stainless steel wires.
10) Clean up the core carefully either by hand or with a fine grade of sandpaper using a continuous motion from the center of the core out to the edge along the span direction.

Another source of transformers for small bows for foam cutting.

from Ken Barker

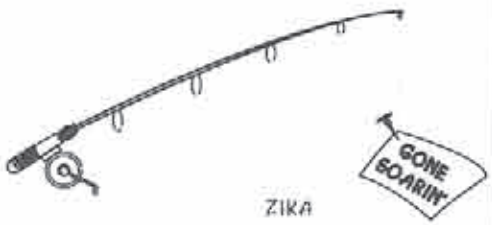
"I have had a Feather Cut system for years and it worked well with a borrowed transformer from a friend's electric train set. I use the standard 28" bow. My friend's son developed an interest in trains — there went my power supply!

"I decided to try to undercut the already low price you found for us at Mouser Electronics. Altronics in San Jose, California, had recently sent me a catalog. They list a transformer for 120V primary and three secondaries, 12V 2A, 15V 3A, and 12V 5A. The price is $6.95. I hooked it up to a dimmer, and it works just fine at about half the rotation of the rheostat's knob. I had tied off the first two pairs of secondary leads, and I haven't finished the 60" bow I'm building to see how much farther apart the alligator clips can go and still generate sufficient heat.

"Altronics can be reached at http://www.altronics.com or (voice) 1-408-943-9773, (Fax) 1-408-943-9776. The catalog number for this transformer is 932009."

That's it for this time. Thanks very much to Jeff, Pat and Jim for sharing their experience this month. If you're out our way, take a look at the wings they build (or check out their planes at the NATS this year) and I think you'll agree that these guys are among the best builders around. Follow their advise and I think you'll wind up having a really good time cutting cores.

■



THE NATURAL SIDE OF THERMAL SOARING

By Lee Murray
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lmurray@athenet.net
http://www.athenet.net/~atkron95/pcsoar.htm

In the previous column, Martin Simons gave us a good survey of what produces the thermals we can soar in and, in general, what makes certain places and times better than others. Part 2 of this series will deal with solar heating, the energy budget, daily temperature range, and the effect of surface moisture. Everyone that has been soaring for some time has at least antidotal evidence for the energy balance. Hopefully this article will tie their experiences with meteorological science.

The radiant energy from the sun travels 93 million miles through the vacuum of space to reach Earth. About 55% of the incident solar energy on the Earth is reflected back into space. Virtually all of the 45% which reaches the ground surface is dissipated in four ways[1].

Conduction - the direct transfer of heat from one material to another by direct contact, e.g. from heated ground to the air moving over it or the colder ground beneath it. These materials are not good conductors of heat, so conduction will play a minor role.

Convection (or sensible heat) - the direct transfer of heat in a fluid, like air, when it becomes less dense and rises off the warm surface and is replaced with colder, denser air. (Density is the weight of a given volume of material.) The colder air becomes heated and again rises and is replaced again. *I hope you get the picture here.* Thermals fall into this process. The response of the atmosphere to uneven heating is to equilibrate the system through convection. In the process, we have air moving horizontally (wind) and vertically carrying with it heat and moisture which causes clouds and precipitation. According to a government Internet site about weather, "Most heat energy in the atmosphere is transferred by convection currents."[2]

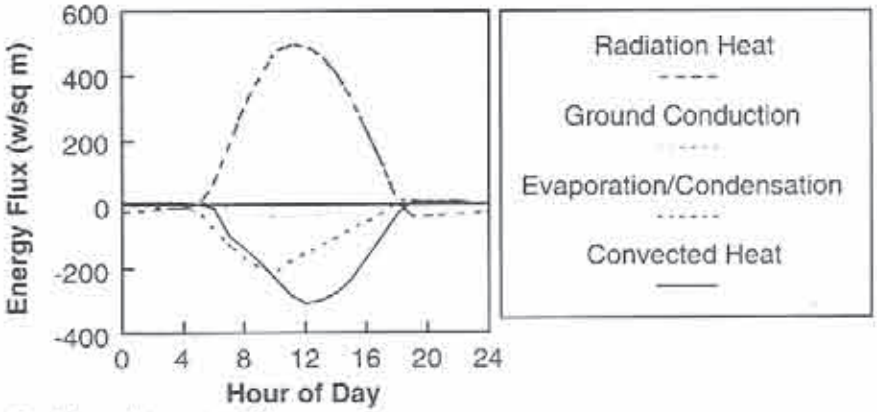
"Another facet of convection that is not readily apparent is the influence of the wind speed. Thermals occur when the vertical temperature difference is large, and this occurs more easily with light winds. When the wind is strong, the convection heat may be the same, but the volume of air that is being heated is larger. This results in smaller vertical difference, although the sensible heat may be the same."[3]

Radiation - the transfer of heat energy as part of the electromagnetic spectrum. It travels through air or space. This is the energy you feel on exposed skin in the proximity of something that is very hot. The ground receives energy during daylight hours and emits energy to space (via radiation) and to the atmosphere all the time.

Figure 1

Energy Budget

July 1992

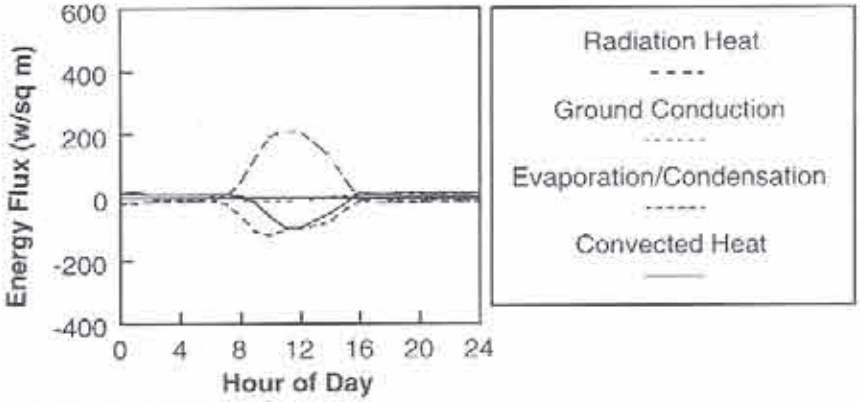


Test Area - Livermore, CA
Data Courtesy of Frank Gouveia - LLNL

Figure 2

Energy Budget

December 1992

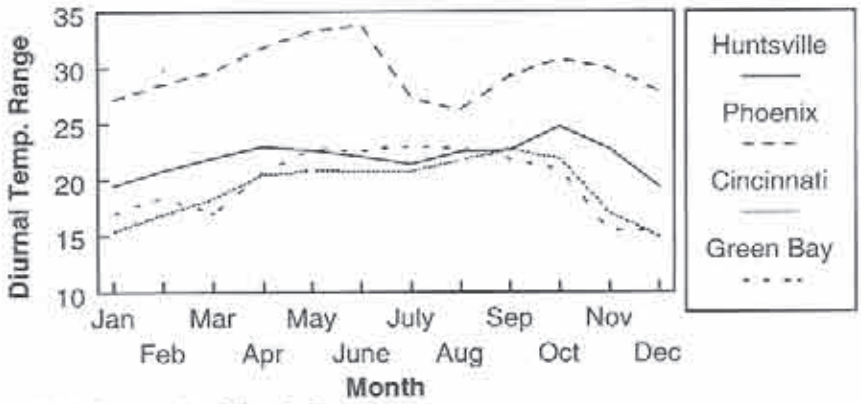


Test Area - Livermore, CA
Data Courtesy of Frank Gouveia - LLNL

Figure 3

Daily Temperature Range

Areas Compared



NOAA Comparative Climactic Data
30 years through 1980

Figure 4

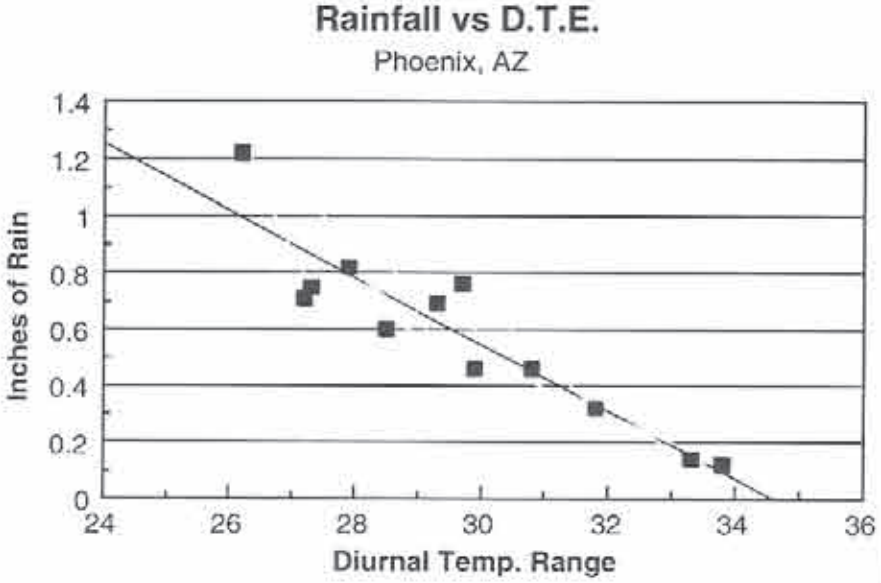
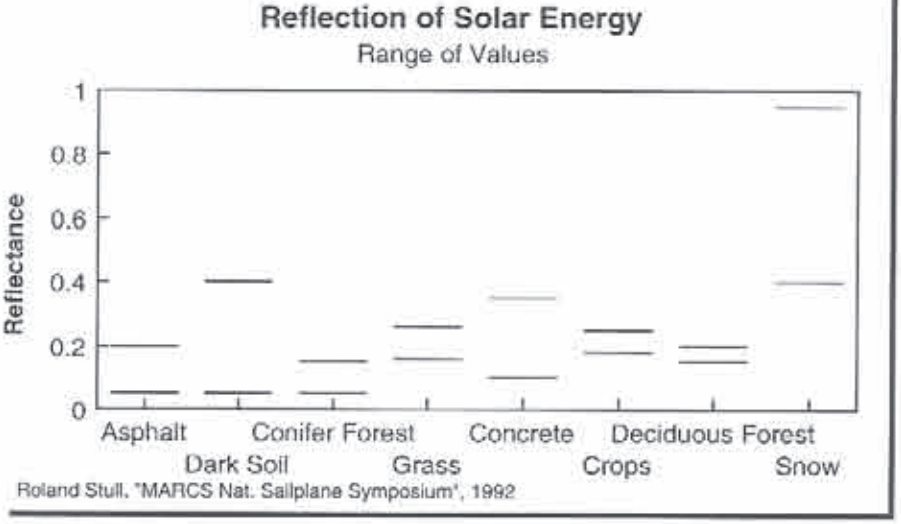


Figure 5



Latent Heat Transfer - There is a latent heat associated with water changing states, e.g. evaporation (liquid to vapor). Latent energy reduces convective heat flux from wet ground and from vegetation. The effect is seen on the energy budget. Latent heat is added to convective heat when dew condensation occurs (vapor to liquid).

The **Energy Budget** is a tool used to discuss heat absorbed and dispersed. Since energy, like matter, is neither created nor destroyed[4], it is possible to account for it if you have all the data. Figures 1 and 2 shows real energy budgets for Lawrence Livermore National Laboratory for 10 days in December and 10 days in July. These come as the result of the generosity of Frank Gouveia, a meteorologist at LLNL.

The horizontal axis of this energy budget is hours of the day and the vertical axis is energy flux (watts/meter^2). There are four lines plotted on each figure:

1. **Radiant** heat flux includes a wide spectrum of solar energy coming in during the daytime and infrared energy lost to space at night.
2. **Conductive** heat flux includes energy transferred into the ground during the day and returned when the surface cools at night.
3. **Latent** heat flux reduces surface temperature during evaporation of moisture during the day and increases surface temperature during periods of dew formation at night and early morning. This effect is harder to see in the plot and has more error in the measurement.
4. **Convective** heat flux from the surface, which includes the heated air rising higher into the atmosphere.

Compared to the July data, the December data shows less maximum incoming solar energy, a shorter daylight period, a lower angle of illumination, and more cooling from evaporation. For both Figures the maximum energy gain will occur at about 12 noon when the sun is highest (without clouds). This will also be the time when temperatures should be climbing the fastest. The maximum temperature is not reached until mid afternoon, about 3 p.m.[5]. You can see a positive period of latent heat in the evening when dew is formed on the ground. It is interesting to note that the convection heat is lower early in the day due to evaporation of moisture and associated cooling effect. After the dew is off the surface, more heat is available for transfer to conduction and convection. The peak of convection occurs some time after noon as the surface reaches its maximum temperature. After this point, energy leaving the surface exceeds the energy being delivered by the sun and the temperature declines until some time the next morning. Twice during a day (after sunrise and before sunset) an equal amount of energy is gained from solar heating and lost to space.

With all other things being equal, convection, which includes thermal generation, should be greatest in summer. In practice, experts say that thermal generation is better in spring and fall due to other factors[6], but that will be left for another column.

A consequence of the sun shining at a lower angle of incidence during the winter, spring and fall is that an east-facing slope will heat up faster in the morning than a flat surface and a west-facing slope will heat up later in the day. You might use this concept in choosing where to fly if you have hill and flying site options.

The surface composition on which the solar energy falls has a major effect on the temperature rise for the illuminated surface and the air moving over it. Water is the least efficient in absorbing solar energy. That which is absorbed can be lost through evaporative cooling or latent heat transfer. When the sun is low in the sky, most of the energy is reflected off the surface. So oceans, lakes and moist surfaces are slow to heat. Another property of water is that it has a high heat capacity (the ability to store heat). When a large body of water gets heated, it holds that heat and releases it over a long period of time. Thermals containing high humidity can rise from swamps and lakes at night and even during the day at those times when the air temperatures become equal to or lesser than the water temperature.

I will offer as an illustration (Figure 3) which is a comparison of the diurnal temperature ranges (daytime maximum less nighttime minimum temperature) which I shall now call (DTR). I found NOAA records for maximum and minimum temperatures by month for several areas where we have *RCSD* readers. Phoenix is the only city in a desert environment for my study. The DTR for Phoenix stands out as being much higher than the other cities that are known to be plush with vegetation; at least during the summer months or perhaps most of the year. Despite these other cities differing considerably in their average tempera-

tures, the DTRs aren't that different for summer months. Green Bay and Cincinnati differ from Huntsville during the winter due to ground cover and the sun being lower in the sky.

You will note that Phoenix's DTR by Month plot has a dip in the months of July and August. I tested my hunch that this was because of the "Arizona Monsoon Season" my flying acquaintance, Ian Douglas, told me about for that time of the year. Note the correlation between average DTR and monthly rainfall in Figure 4. This should impress you that evaporative cooling has a huge effect on the DTR and local surface temperature rise — the engine that promotes thermals. An important part in converting DTR to usable thermals would be contrasting areas with uneven heating.

In the absence of clouds, solar heating is a function of season, location, and moisture content of the place where the solar energy falls. At the extreme, you can have huge diurnal temperature range variation of up to 50 deg F in desert and sandy terrain as are found in the desert Southwest. At the other extreme would be air over cool water where the diurnal temperature range may be as small as 5 to 10 degrees F. Between the two extremes are swamps, wooded areas, crops (e.g., sod farms), grasslands and plowed fields. The data for Figure 5 shows different levels of reflectance (opposite of absorbency) for solar energy falling on different areas. The bars on the plot represent ranges in reflectance. These data appeared in a paper by Prof. Roland Stull.[7]

In his book Understanding The Sky, Dennis Pagen lists daytime thermal sources for full size soaring: house thermals, high ground, heated areas, bare ground, dry fields, plowed fields, rocks (later in the day), and chalk areas. He also lists things to avoid as being: wet areas, low lands, green areas, areas in long shadows, and blue holes in the sky.

My experience has been that when the grass or ground is damp at the sod farm where I fly, lift will only be found over a road, a building or an area with taller vegetation. During a dry period, lift can be found most anywhere but more likely downwind of some feature where a thermal is likely to lift off the surface. My OFB Bob Johnson flies off the grassy area of the University of Wisconsin at Fond du Lac. Local thermals are often hard to find, but he has found that, with a high launch, he can catch rising air that has lifted off warmer surfaces, upwind, in the city[8].

When my friend, Dave Beck, wanted to set a solar powered distance soaring record, we planned to improve our chances of success by going to the desert southwest. Dave's team, including myself, went to Tucson, Arizona in May of 1997 to re-establish his cross-country record for a solar powered model at a 100-mile distance. Dave got the support of local modelers who were planning on helping us with the logistics. We planned to fly between Ajo, which has the most available sunlight in the country, and Tucson. Unfortunately, we were thwarted by Mother Nature who delivered unseasonable clouds and even some rain while we were there. It was a good plan with an unexpected outcome. *The Mother's Day Curse was suspected...but that's another story.*

See you next time when we will expand the topic to include the mixed boundary layer and stability of the lower atmosphere.

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1 Dept. of Transpiration (FAA) and Dept. of Commerce (NOAA). Aviation Weather. ASA Publications, Washington, 1975 ed. 7

2 http://air.llnl.gov/lessons/elementary/Weather/coverpg.html, unknown author

3 Gouveia, Frank. Personal correspondence. Jan 19, 1999

4 The Conservation of Energy principle states that the total energy of an isolated system remains constant regardless of changes within the system

5 Pagan, Dennis. Understanding the Sky (Published by Dennis Pagen, Mingoville, PA 16856), p. 8

6 Pagan, Dennis. p. 10

7 Stull, Roland. "Thermals" MARCS National Sailplane Symposium Nov 3-4, 1984. (Proceedings published by the MARCS Club and available from Al Scidmore, 5013 Dorsett Drive, Madison, WI 54711)

8 Johnson, Bob. Personal communications on January 19, 1993

■

GORDY'S TRAVELS

What do an Airtronics Stylus, Hitec Spectra, Hobby Lobby Power Stick, George Steiner's Radio Book and a Bag Tag have in Common?

by Gordy Stahl
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They have nothing in common, but they do have something in 'extraordinary'! This trip takes you with me on a trip to necessity. No, it's not a town, but rather a condition. Hop on board and I'll tell you what I mean.

(***WARNING:*** *Taking this trip voids your TX's, and the Spectra's warranty. (Except for the installation of the Bag Tag!) Not so much that anything will get damaged, but more because this stuff was never intended to be used with each other! It's do'er beware when you start futzing around with your electronics!)*

That stated, let's head out!

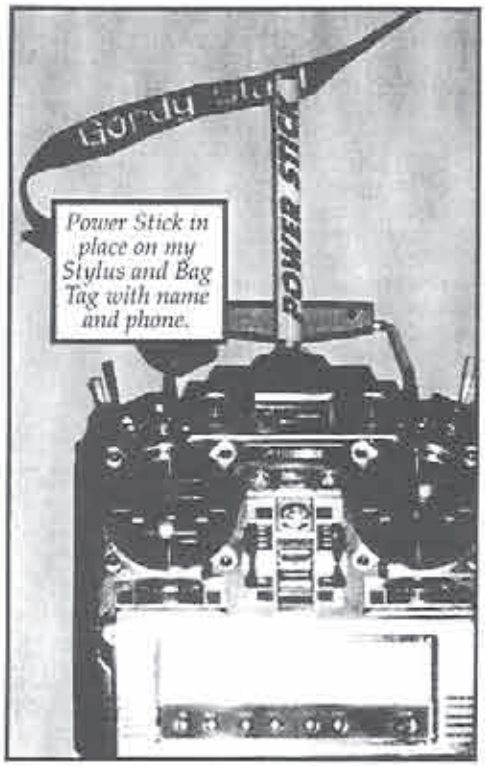
With all my traveling it wasn't uncommon for me to be skunked by frequency conflicts when I would show up at a flying field. At home we all had our frequencies listed and avoided conflict on club fly days; no waiting for someone to get out of a thermal. Instead, I could hook up and launch right in with them.

It really came to a head when I showed up at the Cumberland, Maryland mountain slope fly. It's one of those too good to be true occasions, an absolute ten on the slope fly scale, up a rocky, washed out road, risking the mini-van's belly to get to the site. 'Course that morning I was sitting in a motel in northern Delaware, on the phone with Joe Melchoire, discussing how and where we would rendezvous. He lives in southern Delaware on the coast and has a Mooney; you know, one of those fast, little ships with the swept forward vertical. I told him there was a strip near the motel, but he didn't like that one cuz it was tight and grass, and not too well lit at night for our return. He suggested a county field nearby and a time.

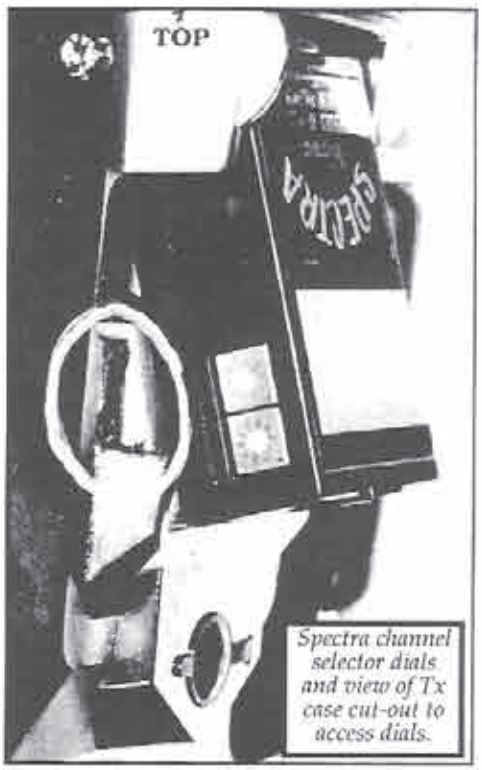
I headed over and was sitting in a factory parking lot where the field HAD been about 6 months prior, when he comes banking over with a *roarrrrr*! We didn't have any way to communicate in order to change our meeting place, so I headed out to a pay phone with hopes of contacting a tower to radio him. I chose the little strip I had mentioned; what a surprise to find, when the girl answered, that Joe had just landed and was waiting for me! Unbelievable, as we were on our way to Cumberland within minutes. That is what you call two guys who really want to soar! Okay back to the article...

I got my ship out of the van; conditions were to die for. I went to the freq. board only to find that someone else was on MY frequency. It's a guy notorious for parking in the sky. What to do? Well fortunately, I had a spare crystal and module to get me clear, but it would have been a major tragedy if I had not been prepared.

So, it got me thinking about the Spectra Synthesized TX module that some guys



Power Stick in place on my Stylus and Bag Tag with name and phone.



Spectra channel selector dials and view of Tx case cut-out to access dials.

were installing in their Futaba's. I spent the rest of the trip discussing it and, when I got home, I called Hitec. Their people were great but, understandably, didn't have any information on adapting it to Airtronics. Actually, at that time, I was and had been flying JR for a couple of years. I didn't like the on-board model memory limit (10), and also wanted more control over some of the advanced sailplane functions; V-tail reverse differential, reverse differential for ailerons in crow to add extra yaw, and added roll control among others that I still don't completely understand even now, but wanted, anyway.

The Airtronics Stylus was the TX that the 'big dogs' were using and I had friends who knew lots about them. If I could add the synthesized Spectra Module to it, I felt that would really give me the radio I had been hoping for. Another neat feature was the Stylus' memory card. While it holds 50 models in memory, the fact that it is removable added an extra value.

If I wanted a 'big dog's' setup I could pull the card and mail it to him, ending up with all that expertise in my TX! (Thanks for the Psyko setup, Mike Fox!)

The next step after Hitec was to contact Airtronics. They had a similar position of requesting that no mods are done to their product, not so much from a liability aspect but more from a reliability aspect. (A lot of years of expertise and experience are collected in that building.) But, they had heard of Visions being fitted with Spectras. Ah ha! I figured if it fits a Vision it should fit the Stylus; same modules, right? Not! The Stylus module has 9 pin holes in it; the Vision and other Airtronics TX's have 8 pins on them. Hmmm, what to do?

Only one thing to do and that was to go to the 'Dali Lama' of RC, George Steiner. George has been a RC Electronics columnist for years, and he was part of the group of guys who pioneered the standards beyond 1991. He has tested nearly 2000 TX and RX systems for the manufacturers and for the hobby.

He authored a book on the subject of our radios and includes the various modifications many have hoped were possible for both RXs and TXs. You say you want 6 channels out of your tiny 4 channel RX? It's in the book. You say you want to change a gear switch to a variable dial pot? It's in the book. You say you want to make a TX modulate to other brands of RXs? It's in the book. An on board digital glitch counter to see if your Rubber Ducky is as good as the stock extension antenna or a treatise on the subject? Yep, it's in the book. Which book? George's of course! (Check the end of the article for a phone and email address to order one.) It's the "A to Z Radio Control Electronic Journal".

George confirmed that others had contacted him about the possibility of adapting the Spectra to the Stylus, but hadn't had the opportunity to try it; however, he had a new Stylus from Airtronics to perform some other testing. He knew that the 9th pin was for the RF disable when the "Display" switch was used on the TX for programming. The stock Stylus module had a circuit inside of them to disarm the RF, allowing modelers to work in the program without modulating. The Spectra didn't, so didn't need that pin. In fact, the Spectra only had 5 pin holes!

Well, it didn't take him long to figure out which wires went where and safely. One neat feature was that only 4 pins were actually used, simplifying the adaptation. If you look at the drawing you will see that there is a capacitor in line to one pin; other than that, no other component is needed to make it all work.

George was very adamant about NOT modifying the TX or the Spectra Module in any way. He would not be part of any TX or RX rewiring. Fortunately, the adaptation

was only a matter of creating an adapter cable. Armed with the circuit, I headed over to the local Radio Shack to find the components that would lend themselves to the project.

I found a computer cable socket that, if the ends were trimmed, about one pin on each end would snuggle right into the Stylus' module cavity, canceling any chance of plugging onto the wrong pins; it was low profile enough to be just right for the size of the Spectra's case position.

The Spectra's overall size is smaller than the Airtronics stock module; that makes it easier to get it mounted in a position for accessing the two dials, on the side of its case, to select channels. I didn't want to have to yank the module out of the TX every time I wanted to switch frequencies, as I felt it was not good for the wires or connections. I used a piece of EPP foam with some two way carpet tape to both space out the module to the right height and to retain it in the cavity. The module is mounted upside down on my installation, which positions the dials on the left side. This also provides access to the dials via the module cavity's 'thumb' hole.

Since the Spectra needed pins to reach up into it for the adapter assembly, I found a computer cable Pin Block at RS, that I could pull the pins out of and would be long enough to reach fully into the module. You will see by the drawing that I bent a small 90 in the top of each of the four pins, soldered the wire and slipped a fairly long piece of shrink tubing over it to insulate the pins from the socket block connections and from each other. The pins were then inserted into their respective holes; I added a piece of electrical tape over the spot for added security.

The capacitor was soldered in line with the proper wire. Notice the direction of the arrow on the capacitor for polarity. The socket block is pushed over the TX module pins, a small piece of foam is dropped in place with some two way tape, and the Spectra is placed in the top right of the cavity.

Notice that I notched out a small piece of the TX case at the left thumb access hole, to provide access to the Spectra's dials without removing it from the TX. (The notch left an opening in the case, which I sealed with a dab of black silicone.) By the way, the module comes with a 'tuning wand' that clips right on to the Stylus' carry handle and is pretty much out of the way; so no worries about losing it or finding some place to keep it. (It's not shown in the photos, but it fits opposite the bag tag.) A small flat screwdriver works, too.

George's book shows how to adapt it to other brand and model TX's, and also shows how to simply re-solder a jumper in the Spectra, so that it modulates to other brand RXs. It is a permanent jumper, so you can't switch at will. It comes modulating to Hitec and Futaba, but that is no worry to the Stylus, as you have your choice of modulation in the radio's program. Yep I can run anyone's RX, as long as it is on 72mhz.

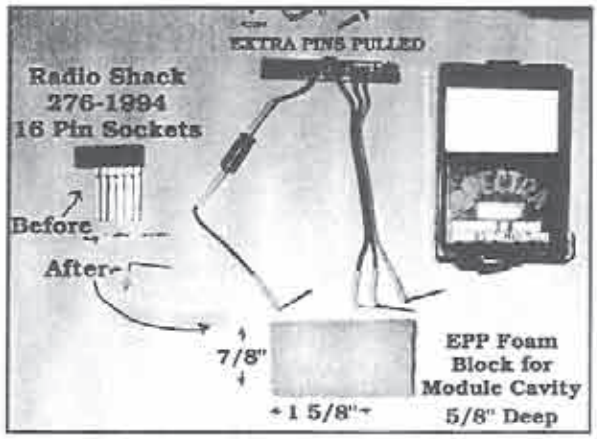
So now I have all that I hoped for: frequency choice on demand without the extra expense and worries of carrying spare modules. I do however have to carry a selection of spare RX crystals. Fortunately, the current batch of RXs are tolerant enough to allow field channel switching. Also I have the incredible flexibility of feature programming included in the Stylus' Sailplane expansion card.

The next 'had to have' feature had to do with the antenna. As soon as I heard about the Rubber Duck antenna, I had one on my TX. It was great not having to extend that 36 inch antenna. But, the Ducks weren't without their annoyances either. First, I left two of em in motel rooms, probably buried in the blankets when I left. Next, since they were always drooped, I would sometimes find them lying on the ground in front of me as I tracked my slope ship to and fro.

The Duck's swinging finally led to either unscrewing or disconnecting. It was not a shortcoming of the Duck's design, but rather due to my carelessness (which annoyed me that much more!).

While visiting Stan Koch in Tennessee, he told me that Jim Martin from Hobby Lobby had come to the club meeting showing a new 5" long, HARD ducky called the Power Stick, manufactured in Germany. I knew that was the crowning touch for my 'Frankenstein' transmitter.

The Power Stick seems like a carbon tube with wire wrapped around it and shrink tubing over it. On the bottom is a threaded hole where some supplied thread adapters can be fitted to match the output mount of the TX. Very convenient if your TX has an 'outy' mount. You know, one of those swivel mounts that your antenna screws into, versus into the body of the TX. If yours has an 'inny', then Hobby Lobby offers an adapter kit, no wiring needed. Just remove the original antenna and screw in the adapter stub. It sticks out enough to

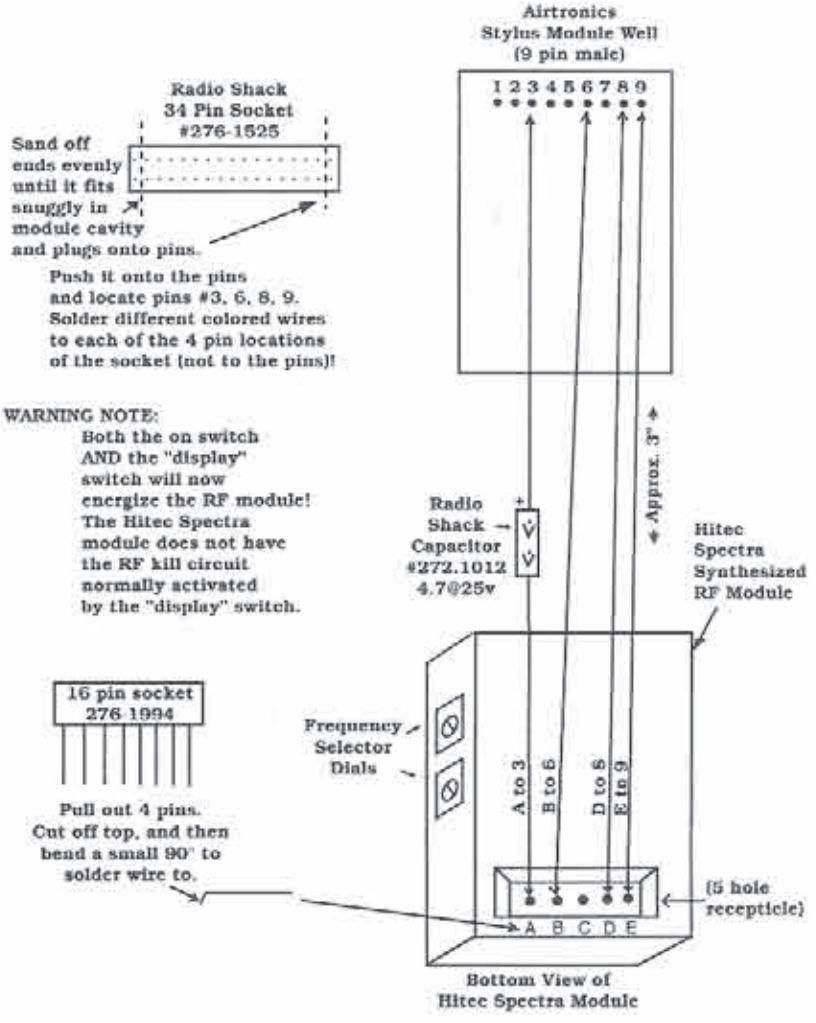


Adapter components. (Below) Hobby Lobby's Power Stick Tx antenna with threaded insert adapters.

screw on the Power Stick outside the body of the TX.

I have flown this hybrid concoction in 7 states and none of them involved chemicals or liquids... I have flown it in crowed slope environments and wayyyy out in searching for thermals. No glitches noticed, so far.

The next thing was to make a remote mount for my RX crystal! That way I



wouldn't have to dig out my RX to change freqs. Quick and easy!!!! Dream on; it can't be done.

I tested by using a 2" JR extension lead. The male pins (with the middle one pulled) fit right into the RX crystal socket, and the crystal fits right into the female socket of the extension lead... And it left me with a range check of a whole 2'; yes, two feet!

Back to George, who got to play the heart breaker. He confirmed it; as the crystal uses a very small amount of energy, and is an integral part of the circuit, often its placement on the board is critical to the design. Well, at least the rest of it worked out. I made up a small plastic block to hold my crystal collection in a clear plastic servo box, and got real good at reaching my ships' RX crystals in the field.

At that Cumberland Slope fly, I met Jim Prouty. Jim is the maker of Radio Mitts, Wing Sleeves and other sewn-up neat products. Recently, he came up with the idea of offering a product used by guys in the Air Force. He calls it the Bag Tag, a strip of heavy nylon strap with the owner's name and phone (for instance), which can be clipped to your TX, winch, travel box, or whatever. I thought it was a great idea, and installed them on my Stylus, TX bag and travel box. It's just the right size to be annoying enough to get your attention and you can order it in a variety of colors. Red or blue base with yellow lettering seems to work out well, by the way.

IF you decide to take this trip, make sure your connections are correct; there are only four but a mistake smokes the module. Take care to protect each connection from shorting with another. YOUR ADDED RESPONSIBILITY!!! The numbers on the side of the Spectra dials are tiny, and mis-selecting the frequency is easy. The term Dial-A-Crash was common with the old Kraft synth units and it had to do with user error, not component error. Get in the habit of double-checking your settings and keeping your finger on the OFF switch when turning on. That way if you hear, "Hey! I'm getting hit," you can quickly turn off, just in case it's you! You are sure to have questions, so post them to me at GordySoar@aol.com.

So there it is, a trip to creating the TX of my desires. Those of you who read this column know that I build and fly sailplanes, I like neat, trick and fun stuff and am always collecting ideas as I travel the roads. Got to pack; off to North Dakota; see you next issue!

Sources:

Airtronics Stylus, (714) 978-1895 (call NSP for pricing)

Hitec Spectra-Hobby, Horse@Hobbyhorse.com, (800) 604-6229 ($99)

JT Models, JTProuty@hotmail.com, (410) 315-8688 ($5 each)

HobbyLobby, 74164.2423@Compuserve.com, (615) 373-1444 ($39ish)

George Steiner, GSPPROD11@aol.com, (619) 362-1962 ($19.95)

Radio Shack, p/n's 276-125, 276-1994, 272-1012

4 strands of colored servo wire approximately 3" long

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HAVE SAILPLANE, WILL TRAVEL!

Polipoli

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This column is dedicated to soaring vacations.

This month's contributor is Lt. Duane Asami, from the Island of Maui. Duane has been a police officer for 23 years. He bought his first plane, a Gentle Lady, in 1993, and got the radio when he took his youngest son to Los Angeles to visit Disney Land. About two years ago, he started sloping a DAW foamie P-51 Mustang.

His latest foamie is an EPPee, but he writes that he is still a thermal chaser at heart and so recently picked up a Sailaire kit. (You may need a bigger island, Duane.) He is a big fan of Futaba radios to keep his 19 plane Asami Airforce flying; and one thing I have learned as a lawyer is never argue with the guy who has the gun.

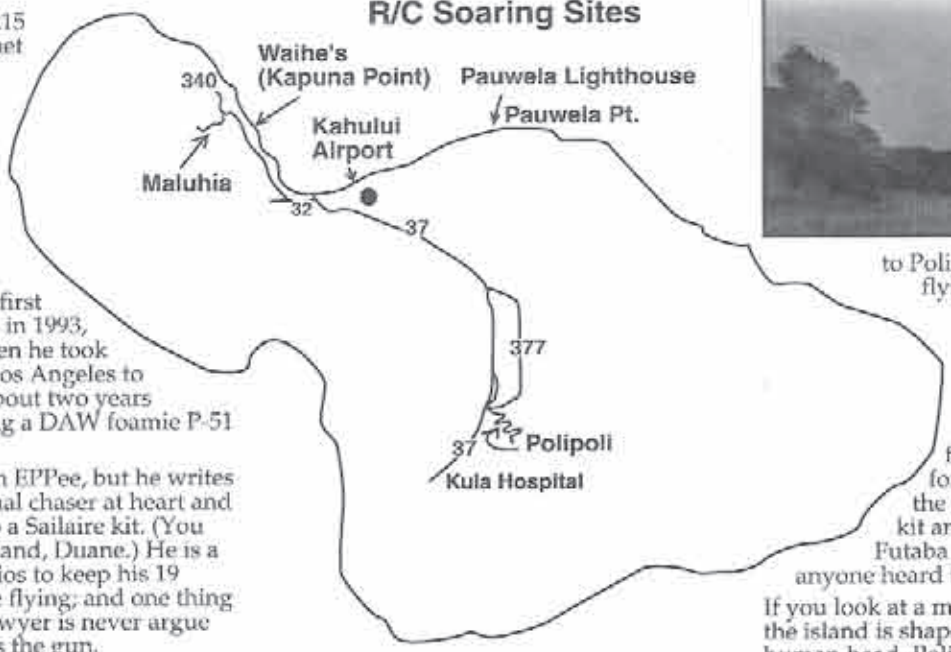
Book 'em, Duano.

Soaring, Maui Style

by Duane Asami
Kula, Hawaii

Everyone who flies thinks that their circumstances and conditions are different from everyone else's. We do, too. We like to think that our sites are unique in flying terms as well as sheer beauty. There are several places to fly on Maui, and there is usually a plane-of-choice for each different site. We'll look at a few popular sites on the island of Maui and describe how to find them. The sites, in no particular order, are: Polipoli, Waihe'e, Maluhia and Pauwela. If you've never been to Hawai'i, don't sweat the pronunciation, we'll work on it together when you get here.

If you're visiting Maui, the easiest way to find any of these sites is to get in touch with M.I.S.O., the local glider club, through our web-site at http://www.maui.net/~mauitom/ or visit Island Hobbies at 230 Hana Hwy. in Kahului and ask the clerk for a contact phone number. The adventurous individuals who like to explore can try to find these sites on their own, but it's more fun to fly with company, so give us a call anyway.



Thermal Soaring at Polipoli

Polipoli is a very scenic area on the slopes of Haleakala about 3,600 feet above sea-level. Located in Kula, it overlooks the isthmus that connects Haleakala to the West Maui mountains. I learned to fly gliders on this slope, as did many of the people in our club. In 1987, my wife and I moved about 10 minutes from this site. On the weekends we sometimes drove to the mountain to picnic with our three children. Polipoli is a gorgeous spot in which to spend a quiet family outing enjoying the scenery. Often, the R/C glider folks would be flying and we would watch the planes thermaling lazily for many peaceful hours. One day in 1993, we went to Polipoli and no one was flying. I decided then that I'd just get my own plane. That, folks, is how I got started with R/C airplanes. I asked around and learned that the plane of choice for that slope, especially for beginners, was called the Gentle Lady. I bought the kit and got my first radio, a Futaba Attack-4 AM system. Has anyone heard this story before?

Maluhia

If you look at a map of Maui, you'll notice the island is shaped like the silhouette of a human head. Polipoli is located near the middle of the neck. Follow Hana Highway (36) east-bound out of Kahului about a mile. Turn right on Haleakala Hwy. (37) and follow it until it becomes Kula Highway (37). Continue along Kula Highway to Rice Park; turn left at Rice Park onto the Lower Kula Rd. Take the first right onto Polipoli Rd., follow it up-hill past Kekaulike Highway (377), past the houses and into the pasture. When you drive over the second cattle guard (steel rails spaced 4" apart across the road) you will make an up-hill right-hand hairpin turn. Drive .2 of a mile from that turn and park; you've found the flying site.

Polipoli is a very easy flying site when the winds are from the north-west. Don't be fooled by the weather forecasts; the wind wraps around the south end of the island, so when the tradewinds are blowing (from the north-east) everywhere else, it's blowing from the north-west at Polipoli. High-speed glass-slippers and F3B types don't do well here. Try a Gentle Lady or

similar, slow, polyhedral ship. The Olympic II, Bird-of-Time and the MiniMax 1000X are other good choices for this site.


Pauwela

Hand launch downhill and look for a little slope lift on the right. Thermals are generally found directly ahead and down-hill from the launch area. Sometimes they show up near the tree line on the far right or the far left, but be careful. If the lift isn't there, you'll have a long walk to retrieve your plane. Most people here search around for a while; then, if they can't get back, they fly down to the lower pasture and try to land near the road so they can drive down instead of having to walk to get their plane.

Landings here can be a little tricky at first. Generally, you kill off altitude until the plane is slightly below eye-level, then make a wide turn to approach from the north-west which means a down-wind landing diagonally across the slope. As you approach the hill, keep lifting the nose until the hill comes up to meet the plane. If you land cross-slope, the wind will be on your wing and after you land, it could flip a light polyhedral.

Polipoli is best flown when the weather service anticipates trade-winds from 5-10 mph and the night is very clear. The ground gets very cold on clear nights and thermals build better in the morning. If winds other than trade winds are expected, Polipoli may not be very flyable. Try to arrive no earlier than about 9:00 a.m., as the thermals haven't built yet and it's too cold to sit around sight seeing. On a good day, you can fly until sunset or your batteries die. Half-hour and forty-five minute flights are commonplace here, although I've posted a couple of hour-twenty minute flights as have several others in the club.

Sloping the Sea-Cliff at Waihe'e

In May of 1998, Alvin Battad of Kahului set the current A.M.A. Class-A Slope Duration Record at Waihe'e (or Kapuna Point). Members of M.I.S.O. met at 5:00 a.m. to get ready for Al's flight and after much prodding, Al launched his Mel Culpepper designed Hummingbird at 5:40 a.m. Twelve-hours-twenty-eight minutes later, he landed with a great suntan and a new A.M.A. Record. Hank Vendiola CD'd the flight with Thomas Cunningham, Gerald Fukuoka and myself timing. After signing the documents, there was still time for the crew to toss out our own planes and rip-up the sky in celebration.

Waihe'e (the nearest town), sometimes called Kapuna Point or Kapuna gate by the local fliers, is a small sea-cliff north of Wailuku. The view is great, the lift is nearly endless when the trade-winds blow and it's a ten minute drive to the nearest McDonald's. Unfortunately, the landings there are not as wonderful as the flying. This is not the place to toss an expensive glass or carbon plane like a Vindicator. If you have a foamie or a less expensive hard-body plane, fine. You may get it home in one piece or you may have some new dings to reminisce about after you leave here. I learned to fly aileron ships at Waihe'e and I'm glad I started with a DAW P-51 foamie Mustang.

Planes that do well here are mostly the foamies, only because of the landing area: the DAW Foamie Mustang, the Studio-B EPPee, the Zagi, the Foameron, etc. Hard-bodies like CR's Renegade and Excel fly very well here, but take a beating on the landings. When the winds are light, it's also possible to fly polyhedral ships here such as the Gnome 2 meter and the Sophisticated Lady.

> ***WARNING:*** Before you fly at Waihe'e, you must understand one inviolable rule. If there are people on horse-back anywhere in sight, DO NOT LAUNCH! If you are in the air when they enter the pasture, LAND THE PLANE! We are only allowed to fly at this site with the permission of the ranch which owns the pasture. They run trail rides for tourists. If your plane spooks a horse, someone could get hurt so they don't allow anyone to fly when riders are anywhere in the area. If you can't live with this restriction, don't fly here... Some of those cowboys take this stuff very seriously. There are several tales of fliers breaking these rules and being forcibly removed!

Finding this site: Follow Kahului Beach Rd. north-bound from Ka'ahumanu Ave. (the main highway connecting Kahului to Wailuku) along the coast past the harbor. Take Waiehu Beach Rd. (340) to the intersection with Kahekili Hwy. (330) Turn right and Kahekili Hwy. 330 becomes Kahekili Hwy. 340. Follow Kahekili Hwy. (340) to mile-marker 5, then measure exactly .5 (half) mile from the mile-post marker to a paved shoulder where you can park. Look out over the sea-cliff and you should see a natural arch in the rocky shoreline to the left and directly below should be a short stick with a couple of plastic streamers on it.

Before you launch, check the wind. If it's blowing at least 10 mph and if it's blowing directly into your face from the sea (tradewinds), you're all right. Launch and fly straight out over the cliff for altitude, then do all your aerobatics in front or on the left. Don't expect much lift before you pass the cliff-face because it isn't always there. Stay away from the bowl area on the right if you don't have lots of altitude; the air gets really dirty really fast back there. If the wind is from the left (northerly), the lift is going to be poor and hard to fly. If you do decide to launch, look for lift way out on the right, just outside the cliff face and beyond the stand of ironwood trees. If the wind is from the right, **DON'T LAUNCH**. Flying at Waihe'e can be great, but losing a plane there can happen in seconds and can be very permanent. It may look like a small pasture with short brush, but there are large (100" span) planes still lost in the bushes there.

The landings at this site are interesting. Generally, you use that dirty air in the bowl on the right to kill off altitude as you approach from the right. Drop below the level of the hill to make your approach. As you climb, your plane will lose energy so you should be just above stall as you get to the top of the hill and can land without skidding too far. The landings are generally cross wind here, otherwise you'll be landing with your plane speeding towards you. Not so bad if you judge the approach perfectly, but not to great if you misjudge and put the plane into the fence or your rental car. Also, be careful of the short, scruffy looking bushes; they eat carbon-fiber wings for lunch.

Maluhia, the Fly-What-You-Like Site

Maluhia, named for the Boy Scout Camp which owns the land, is north of Wailuku Town and about a mile north of Waihe'e (the flying site, not the town). The lift is great when the trade winds blow and you can fly nearly any kind of aircraft you want. I have seen a hand-launched Oly II sharing the sky with a Vindicator, also hand-launched. This is a great place to picnic while flying and couples often go there to just lay on a blanket and enjoy the view. The site is scenic, the lift is awesome and the landing area is huge.

Find Maluhia by getting to Waihe'e (Kapuna Point) first. From Waihe'e, continue north along Kahekili Highway (340), .9 of a mile past mile marker 6. The roadway to the camp is on the left and unmarked, directly across the street from the main gate of the ranch offering trail rides. Follow the paved road uphill .8 of a mile to the gate at the State Hiking Trail. The scout camp parking lot will be on the right; turn left and head back towards the

ocean along the dirt road to the edge of the field. While facing the ocean, you should see a small hill on the left, a grassy slope ahead and a tree line on the far right.

If trade-winds (basically, in-your-face when you face the sea) are blowing 10 MPH or more, you'll have fun. If the winds are coming out of any other direction, don't launch. Launch due east, directly across the middle of the grassy slope and be on your guard; there are some interesting rotors in there. The trick to this site is to have faith. If you get part way out and panic because you think you're too low and won't be able to come back, you'll be right. You must push-on until you clear the tree line at the bottom edge of the slope to find the lift. Grab as much altitude as you like out there, then fly back and play directly overhead. Any time you need to get back up again, just fly out to the tree line. Stay away from the hill on the left; the air gets very lumpy there and several planes have visited the heiau (Hawaiian temple) there.

Almost anything will fly at Maluhia. Ships seen there recently include: Highlander, Gentle Lady, Olympic II, Bird-of-Time, Vindicator, DAW foamie Mustang, Super Ridge Runt, Sparrow, Coyote, DG-600 (Can you believe anything that weighs 9.5 POUNDS can fly?), Renegade, Climax... ad infinitum. The only limiting factor is your vision. Remember, you have to go a long way out to find any lift, so small planes become very hard to see. I've lost sight of my Ridge Runt a couple of times out there and if not for the keen eyes of my friends, I might not have gotten it back.

Landings are a piece of cake. Fly waaaaay back to the other end of the pasture and kill off as much altitude as you think you'll need so you can land twenty or thirty feet short of where you're standing. There's a small "bump" of lift right at the top of the slope so, if you come too far forward, it'll pop you up again. Be careful of the tree line on the right; there seems to be a bad rotor about half-way back and a tree that is a genuine airplane magnet. I once saw five planes hit the same tree in one afternoon.

In-Your-Face Sloping at Pauwela Lighthouse

Pauwela Lighthouse is for the very skilled aileron pilot only and is strictly the dominion of the small, high-speed, highly-maneuverable hotrods. Bring lots of lead; you'll be needing to increase your wing loading to enjoy this site. Pauwela is flyable any time the weather forecast calls for trade-winds, the stronger, the better. Zipa Cabral, former club president, flew a scratch-built U-2 here when his Kestral digital wind-meter read fifty-four mph.

You'll want to fly something small here. Spans of 36" to 48" are great, although the 60" racers can also tear-up the sky. Don't bother bringing a full-house two-meter or F3B ship here; you won't want to throw it out. You'll be flying in a "box" only about twenty-feet deep, thirty-feet high and seventy-five feet wide. You'll be flying at very high speeds with your plane less than 10' from you as you move from right-to-left. Try something like a Mini-1 or Blazer.

Pauwela Lighthouse is on the northern coastline of east Maui. Follow Hana Highway (36) east out of Kahului towards the extreme east end of the island. Look for a small community called Paia about seven miles out of Kahului. After passing Paia, watch the milepost markers; you'll want to go .8 mile past MP-11. You should see a pineapple field on the left (ocean side) of the highway and the Haiku Community Center on the right. Take the left onto the dirt road which runs along the edge of the pineapple field and follow it to the ocean. Beware, if it's raining or the road is muddy; don't go down there, as you will get stuck; there are no phones and cellular phones won't work out there. When you get to the bottom of the field, you'll see a small lighthouse (actually, it looks like a small platform on a tall utility pole). Turn right and drive through the broken fence, across the grass to the cliff. If the wind is blowing in your face from the sea, you've found the spot.

Flying Pauwela is aerobic exercise at its best... You don't get sore muscles, but your heart rate goes through the roof. Fly small "rockers" back-and-forth across the face of the cliff and don't get too far out. The lift goes away and you'll be in the ocean in a hurry. Also, don't get too far to the left; it gets squirrelly there and planes have been known to disappear behind the lighthouse, never to be seen again. Landings here are actually not as traumatic as Waihe'e and much simpler once you get the hang of it. Fly from right to left and stay close in to the cliff. On the left, turn out and try to keep the nose a little high to keep from penetrating and building up speed. Let the wind push the plane backwards as you hover about five-to-ten feet off the ground. As it backs over the land, the lift will die and the plane will settle down like a helicopter.

Maui No Ka Oi

There are other sites on Maui, of course, some of them quite nice and very scenic. Visitors and residents alike should try the ones described here first, though; they are the best when the trade winds blow, as they do most of the year. These sites should give novice and expert fliers alike a very nice day of flying and possibly some interesting stories to cherish. After flying these sites, you know why the County motto is, "Maui no ka oi," which basically means, "Maui is the best."

* * *

If you have a favorite sailplane saga, consider writing it down for *RCSD*. If you are planning a vacation that includes your plane and transmitter, consider making notes as you go, and working up an article later. Take photos. Collect maps. And send your story to Tom Nagel at tomnagel@iwaynet.net for gentle editing and suggestions. *Tom* ■

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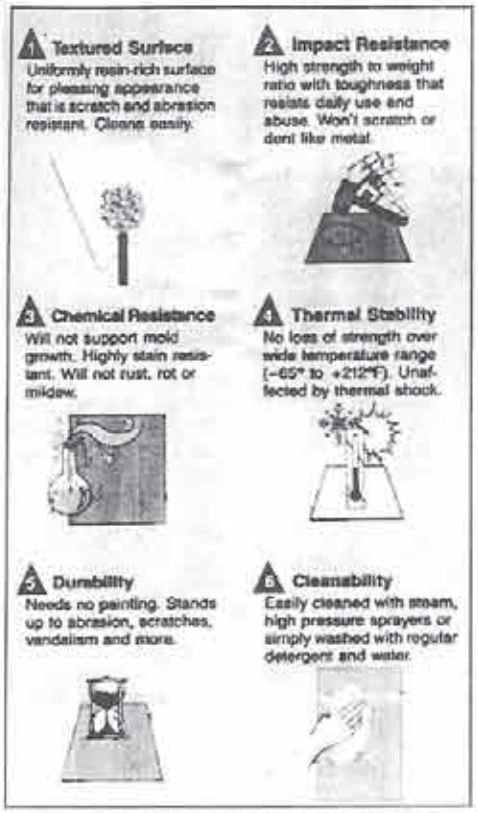

Innovative Cutting Mats

For use with Rotary Cutting Tools, Only

By Scott Hewett
Aptos, California

Have you wanted to buy a rotary cutting mat, but were turned off by the relatively high price of the commercially available cutting mats available today? Do you currently own a cutting mat, but find that it is often too small for your application in cutting fiberglass and carbon cloth for large wing and fuselage lay-ups? Well, once again a product surfaces from the local building supply house which can solve the dilemma, called Fiberglass Reinforced Panels, or "FRP".

If you have never used a rotary cutter, you might give serious consideration to doing so. Many manufacturers use them for their ease and the quality cuts they obtain. Roll out the cloth on the cutting mat, set the pattern on top, and roll the rotary cutting tool around the pattern. No more lifting up the cloth, cutting with scissors and deforming the cloth in the process. You can stack four layers of cloth on top of each other and cut them all at the same time, each one identical, with the use of a rotary tool. The FRP's compressive strength and resistance to cuts allow the rotary cutter blade to penetrate slightly without the tendency to form ruts, which would otherwise affect successive cuts. One or more layers of cloth can be cut with greater ease while following intricate patterns. The FRP is "self-healing", similar to commercial mats and, for me, the physical properties make it much more versatile.

The product? First of all, you've most likely seen them on some rest rooms walls, or bathroom tub and shower enclosures. Many service stations and fast food restaurants use them for a low maintenance type of surface. Some builders use them when converting an older bathtub into a combination bathtub/shower by simply covering the existing walls with these panels. The surface we normally see is similar to an "orange peel" or alternate texture. What you don't normally see is the backside, which is ideally suited to our needs! The back is relatively flat, and feels somewhat like a flexible, clammy plastic. There are many manufacturers of these types of panels, which will be discussed later.

Big, Inexpensive, and Versatile!

Consider the following regarding FRP:

1. A 4'x8' panel costs under $40.00, or $1.25 per square foot, as compared to other mats, which can cost as much as $2.70 to $7.00 per square foot. FRP is easily cut to any size. Your application might dictate that a 2'x5' panel works best for you. Simply cut the FRP to the size you want, or get two or three buddies together and go in on a sheet of it. Three of my friends bought a 4'x8' sheet. Two of them wanted 2'x5', and the other wanted 3'x4'. They paid only $13.00, each! Follow the manufacturers directions for cutting the FRP. For our purposes, mask off the back side where the cut will be, set a table saw or Skil-Saw 1/8" deeper than the thickness, and cut on the orange peel or finished side (just the opposite if you were using FRP for its construction application).
2. Readily available at your local building supply, or you can normally order it if it is not in stock.
3. Versatile!

   This is the first mat I've found that can be used to cut vacuum bags, Visqueen plastic, and peel ply (rip-stop nylon).

   You can cut multiple layers of cloth at the same time. Experiment using firm pressure and you'll be surprised how many identical layers can be cut at one time, without missing one fiber.

   If you desire a grid, it can easily be added by using a felt tip pen. If you cut a particular pattern very often, you can trace that pattern on the FRP with a felt tip pen and see it through the fiberglass cloth you are cutting.
4. You can easily cut light weight surface cloth, as well as the heavy stuff, and many layers at the same time. Yes, cutting carbon is just as easy. When cutting carbon, you will notice the dark "witness" lines where you made the cut, but it does "self heal", allowing multiple successive cuts in the same area. You can also see witness lines on the FRP from cuts made on fiberglass cloth, but they do not affect successive cuts. As a test, I took a 6" x 6" scrap of FRP and literally made over one hundred cuts in every imaginable direction, in the same area, time after time. Very seldom would I miss cutting every fiber, which I attribute to a lazy hand after so many repetitive cuts. Incidentally, my "Olfa" Rotary Cutter has the original cutting wheel it came with three years ago.
5. Easily stored. Drill a couple of holes in one end and hang it on the wall, or slide it behind your workbench. It is more rigid than most rotary cutting mats.

Important Notes of CAUTION!

1. DO NOT cut ANYTHING on FRP with an Exacto, utility knife, or razor blade. You will leave cuts in the FRP, which will not heal. USE ONLY ROTARY CUTTING TOOLS!
2. Do not try to cut Kevlar™. You won't be able to cut Kevlar™ on any cutting mat with a rotary cutting tool.
3. Cut on the "backside", which is the smoother surface. Tip: If you don't believe this stuff works, take your rotary tool and some scrap cloth to the lumber yard. Make some test cuts on the backside of one of their sheets (After asking for permission, of course.). This will not hurt the FRP, and certainly should not damage the sheet for a prospective customer should you decide not to buy it.
4. Rotary Cutting Wheels are extremely sharp. They cut fingers even better than they cut cloth! Keep them sharp, respect them, and don't leave them lying around where children might play with them.

Some building supply companies will sell partial sheets of FRP. Don't hesitate to ask if they have a scrap bin, which may have just the size you're looking for. Also, they may know of a contractor who uses lots of FRP and may have scrap to give away or sell cheap.

As for the Rotary Cutting Tools themselves, there are many manufacturers. They resemble a pizza cutter, but are smaller and much sharper. They can be purchased from vacuum bagging/composite companies, or local yardage/fabric stores. The original cutting wheel supplied with the tool should last a long time with proper care. If the one you purchase does not come with a replacement cutter, it is recommended that you purchase one to have on hand should you damage the original cutter. You should be able to buy a suitable cutter between $7.00 to $20.00.

There are many manufacturers of FRP, with various trade names, etc. If you have access to the Internet, a search will get you more information than you'll ever need. The following specifications are of the particular product I am familiar with, although there are most likely many manufacturers whose product works as well:

Structoglas® Standard (Class C) Wall & Ceiling Panels (FRP)

Product Code 77096, Series #1200 Standard, Textured One Side

Nominal thickness .09".

Sizes: mostly 48"x96", but many other sizes available from the factory.

Manufactured by Sequentia, Inc.

1-800-321-1935, fax (440) 846-2128

Their literature indicates 7 geographically placed warehouses in the U.S., and many district sales offices. Contact them for a list of your nearest supplier.

The only thing I use scissors for anymore is cutting soaring related articles out of the AMA magazine, which are few and far between.

If you currently use a cutting surface of Formica, particleboard, Melamine, glass, Masonite, desk tops, vinyl floors, etc., and aren't totally satisfied with your cuts, try FRP and a rotary cutting tool. You will be pleasantly surprised! ■

Robin Lehman
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Meet Frank Oeste

Let me introduce you to a wonderful, new flying friend. I had the great pleasure of meeting Frank Oeste at the Akro-Cup event in Germany last September. You will never meet a more enthusiastic or charming fellow! His enthusiasm is contagious and his charm will melt your heart; he's no slouch of a pilot either (he came in 4th in the competition flying his gigantic and very beautiful 1/2.5 Bruckmann Fox)!

Permit me to share the following letter with you, so you can get a taste of what it's like to meet him face to face.

A Letter from Frank

"To all scale model glider pilots and those who want to become one.

"My name is Frank Oeste. I'm 37 years old, full scale glider pilot since 1977, and since 12 years I'm also a model pilot.

"My father had done it and so there was no way for me to get out of the way of this. Aviation is my life; I grew up on airfields, staying there every weekend with my parents. Since 1985 I'm an air traffic controller at Frankfurt airport in the middle of Germany. I love this job; it is stress, but dealing with the pilots in their aircraft is great. I'm married with the best wife in the world, Beate, and our sunshine is our 10 month old son, Nils. He likes to stay with me on the model airfield, watching his father flying.

"In November 1996, me and a few other people met in a conference room at a little village south of Frankfurt to organize for the first time an international German championship for acro gliders. We named it: 1st Acro Cup for Semi-Scale-Model Gliders.

"The idea was to organize a championship for modelgliders, which must be built after an original full scale acroglider, and a program with ten figures to be flown: the so called Bekannte Pflicht. It was the first time that such a competition would be organized in Germany. Harald Seitz from Cologne was responsible for the program, Jan-Kurt Hoffmann (of the DMFV) for the money we would need for the event and I had to organize it with my club near Frankfurt and would be responsible for the whole logistics. The German association for modelflyers, called DMFV, for which Jan-Kurt is working, sponsored the competition.

"This was the beginning of a lot of work for each of us. We all spent hours and hours with the project; the programs had to be written, the judges had to be selected and trained; the event had to be sanctioned by the aviation authorities, because the airfield is located near Frankfurt international airport; the model magazines had to be informed, etc.

"But on August, 1-3, 1997 we held our first Acro Cup for Semi-Scale Model Gliders at Dreieich. There where 19 pilots who took part in the competition. The weather was really bad but, on Sunday, the 3rd, we had our first German champion: Stephan Völker from Niedermittlau. He flew a Swift S-1 from Airworld, wingspan 375cm, weight 11 kilogramms. Everybody was satisfied; the competition was a great advertising for our sport and we promised to meet in 1998.

"So we came together last year at the beginning of September in Harsewinkel for the second championship. There I met for the first time Robin Lehman and John Destine. Both are meanwhile good friends to us and fully integrated in our acro family. We had a great competition with 28 pilots flying their gliders like Fox, Swift S-1, Mü28, Kobuz, DG300 Acro, Lo100, Lunak and Twin Astir Acro. The youngest pilot was only 13 years old. The program we flew was the same as in 1997. We change it only every two years. That's pilots wish.

"Stephan Völker, the champion of 1997, won again; second was Harald Seitz with his scratch built Kobuz (wingspan 440cm, 11kilos), and third was Thomas Gleissner, flying a Fox from Airworld (400cm, 8kilos).

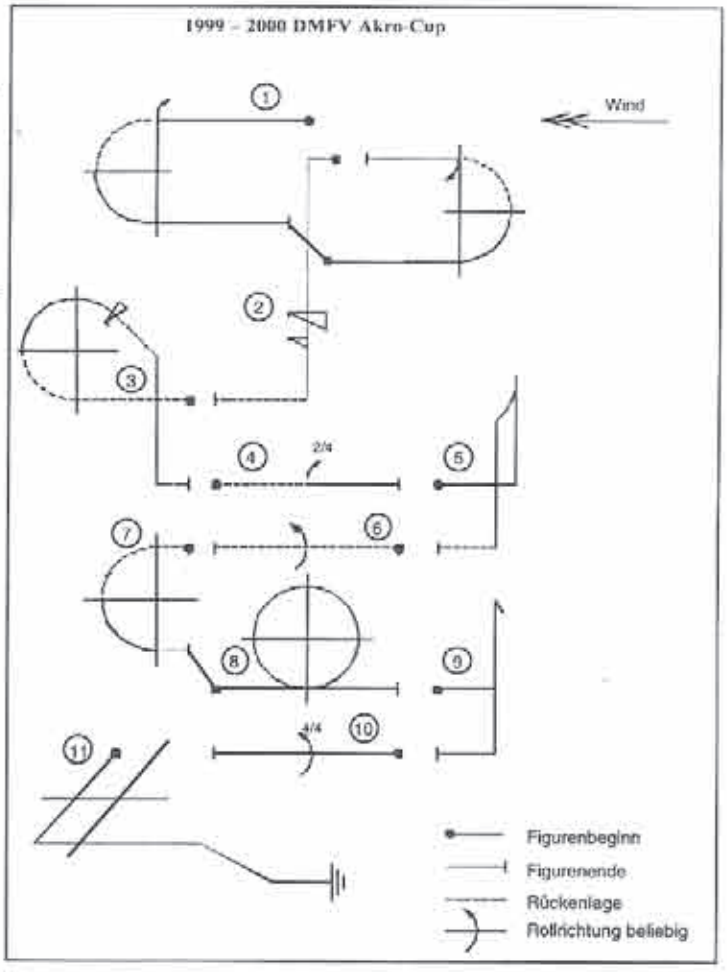
"Robin has got some pictures of the competition; you can see them on web site <http://www.sailplanes.com>.

"This year we will meet on the last weekend in August, 27-29, 1999 at Bad Neustadt/Saale, a nice little town in the mountains of the Rhön. It is located near the Wasserkuppe, the famous hill, from where the glider flying started to spread all over the world in the early 1920's.

"We have a new program, a little bit more difficult than last year, but we are getting better and better, so we all will manage it, I'm sure.

Frank Oeste with one of a kind Breguet 905 Choucas, completely scratch built 1/3rd scale, spans 6 meters, weighing 15 kilos. (below) Frank Oeste with Bruckmann 1/2.5 Fox and 1/2.2 Swift (the largest scale sailplane to compete in the 1998 Akro-Cup).

1. Double Split-S
2. 1 1/2 spins
3. 5/8 outside loop with 1/2 snap roll to inverted
4. 2-point roll
5. Tail slide to inverted flight
6. Very slow roll to inverted
7. 1/2 inside loop
8. Inside loop
9. Stall turn
10. 4-point roll
11. Landing



"My friends and I want to invite you to come to Germany, to share the competition with us. If you have the time and the interest, let's meet in August here in Germany. Meanwhile bring the acro glider flying forward in the US. There are a lot of good models you can build. It is worth it.

"If you need some information, get in touch with Robin Lehman and his Sailplanes Unlimited, Ltd, or write to me! My address is: Frank Oeste, Gabelsbergerstrasse 13a, 63303 Dreieich, Germany; Tele: 06103-81801. If you come to Germany, we will organize the trip for you.

"So you see, a lot is going on in the acro scene here in Germany. Our very enthusiastic glider family is getting bigger and bigger. The models are getting better and the skill of the pilots as well. Everybody can learn from one another. In June we will have an acro training camp, where the judges will take part as well. Acro glider flying is not so difficult as it seems, but it is a lot of fun. I like to fly in the thermals too, but the discipline and the preciseness with which you have to fly acrobatics is another way of flying.

"I hope you like to fly acrobatics now as well, join us in August or get in touch with us.

(signed) Happy landings,
Frank Oeste, Acro Team Germany

If any of you do have a chance to attend this 1999 Akro-Cup, you will find warm hospitality and an amazingly high level of piloting skill. Perhaps even more importantly, your horizons will be expanded and, believe me, your flying will improve by *osmosis*! Just being there and seeing what these guys (and their scale sailplanes) can do will make you a better pilot!

This is the type of experience you are likely to encounter:

The competition was over for the day. The sun was setting behind the prevailing gray clouds, which had threatened all day. We were entering the twilight zone. One of the 1/3 Foxes was pulled out and was hooked up to a waiting Wilga and the two of them took off. After a circle or two they were specks in the sky. The Fox released and circled while the Wilga nosed straight down and, at the last moment, pulled out and flared to a perfect landing. When the motor died, all eyes were glued aloft. It was time to play!

The Fox leveled out and dove. As it picked up speed, it started to whistle; then we heard the sssssshhhhhhhhhh sound of the cool evening air rushing over the wings. Ten feet off the ground and fifty yards out, the pilot leveled out, rolled the Fox on its side and wossssssssshed past us, holding a perfect knife-edge. A roar went up from the crowd. We all applauded.

Seconds later, the big bird sideslipped in for a perfect landing. What a great way to end the day!

This same scenario was repeated again at a model airplane show a week later. The only difference was that this time a slightly smaller Fox was towed practically out of sight (on a nice, sunny day), then dove at the ground for what seemed an eternity. Again we were treated to a long knife-edge. Again the crowd roared its approval. The younger kids seemed particularly delighted!

Sailplane aerobatics are alive and well and are real crowd pleasers in Germany – especially the knife-edge!

The Tools of the Trade

The knife-edge is certainly one of the most spectacular maneuvers you can perform (with a sailplane). You need a highly aerobatic glider, with a lot of rudder. It also needs to fly just about as fast as possible. With those ingredients, you will be well on your way to being able to perform the knife-edge yourself.

The Knife-Edge

(difficult for all sailplanes)

The knife-edge is fairly easily done with powered aerobatic aircraft such as the Extra, Christian Eagle or Cap 232. Any very powerful aerobatic model with a very generous rudder can perform the knife-edge with relative ease. When at speed and at full throttle, the prop wash over the rudder is sufficient to keep the airplane flying sideways with the wings perpendicular to the ground. With enough power, the knife-edge can be sustained just about as long as you want. In fact, with the right combination, an airplane will climb while in knife-edge and can even perform a knife-edge loop (which is impossible with a sailplane). The motor really helps out a lot! Without the motor, a sustained knife-edge is more difficult and can only be flown until the glider runs out of airspeed.

The sailplane has no motor and so the air flowing over the rudder (which keeps the glider flying sideways) comes from airspeed alone and the limiting factor (just how long the knife-edge can be held) depends entirely on inertia and drag. The inertia keeps the glider speeding along and the drag slows it down until it won't fly any more. Once again, it's all about energy *management*.

Energy Management

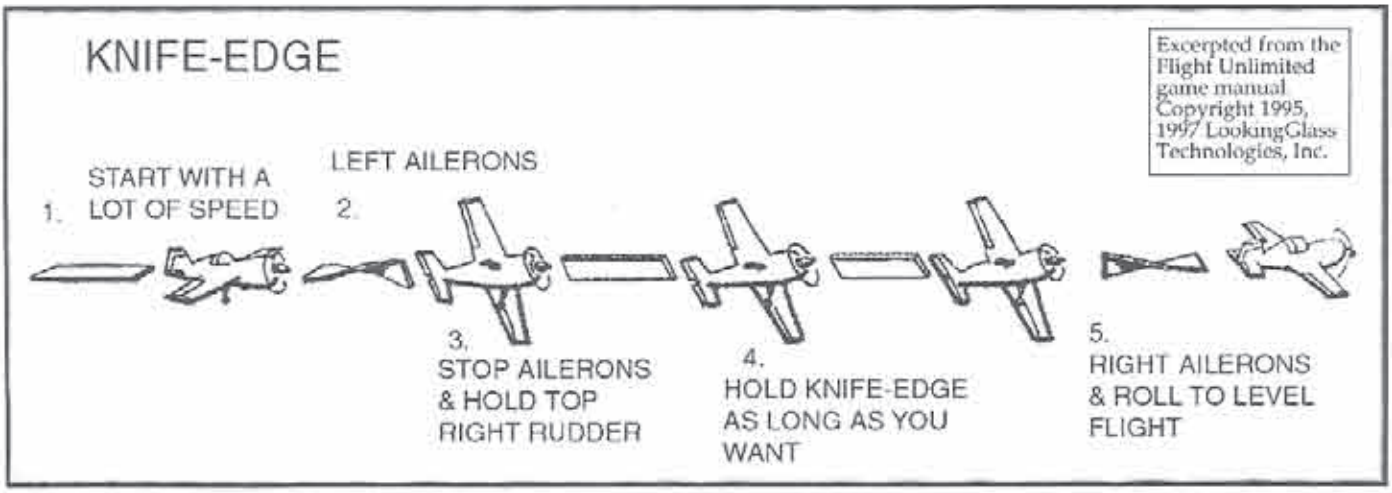
Energy management is perhaps the single most important factor in sailplane aerobatics because the energy is so precious. You can't power up and climb to height again (although you could catch a thermal). As an aside, two years ago when I flew the Roedelmodell Fox on its maiden flight at the Pensacola fly-in, I tried out some aerobatics all the way down and was ready to land. On the approach, I managed to catch a thermal and climbed to height again. Here I was able to use thermal energy (and ended up having the longest flight of the day with two aerobatic sequences thrown in).

You might have heard that Einstein loved the violin, but did you know that he also had a passion for sailplanes? In fact, he wrote the following equation which handily expresses the above-mentioned energy factor: H=E or to simplify, Height = Energy.

The sailplane pays for every inch of airspeed (and acrobatics) with every foot of height. So energy management, and planning for it, is of vital importance in planning aerobatics for sailplanes.

The knife-edge has perhaps the most voracious appetite of all aerobatic maneuvers and eats your precious energy like crazy. Not surprising, when you think about it. After all, the only things which are keeping the glider flying is the fuselage, fin and rudder (which acts as the elevator).

By the way, a great place to try out your aerobatic skills is off a slope. Here, the energy of the wind coming up the hill keeps the sailplane in rising air. Given the right hill and the right wind, with a little planning, you can fly aerobatics for as long as the wind blows. You have the added benefit of being able to fly at eye level so slope stunts are particularly attractive to watch.



How to do it?

How DO you do? Nice to have you along so far! It's nice to know that someone is still reading this...

Some time ago, I introduced the 4-point roll and so have already sewn the seeds for the knife-edge. In the 4-point roll you briefly do fly sideways on – twice in fact. So if you have become familiar with the 4-point roll, you are well on your way to try the knife-edge. Fasten your seat belts and here we go.

1 Dive to get as much airspeed as you can (but don't dive more than you have to or you'll waste your precious energy/height).

2 Apply full ailerons and stop the rotation when the glider is sideways on (wings perpendicular to the ground).

3 Apply top rudder and hold the sideways flight for a while (hold the knife-edge as long as you can or as long as you want to), then apply ailerons to rotate back to level flight (inverted or right side up – you choose). And voila, that's all there is to it.

That all sounds simple enough and, indeed, it's not all that complicated a maneuver if you have enough airspeed and if you apply top rudder when needed.

Top Rudder

- Top rudder is when the rudder acts like the elevator (the rudder is turned sideways on, horizontal to the ground).
- How do I know which way to push the rudder stick to make it act like UP elevator instead of *DOWN* elevator? A good question. Whatever goes up also comes down – so too with the rudder when it's tilted sideways and acts like an elevator. You can input up elevator (rudder) and down elevator (rudder). With the knife-edge no matter whether you get into it by rotating left or right, you will probably always need top rudder.
- How do I figure out which way to push the sticks for top rudder? The answer is simple. I have flown for years and whenever I tried knife-edge I had to think a lot – which way to turn the rudder... And then one day I was practicing on a computer flight simulator and came up with a very simple answer. Whichever way you push the aileron stick (right or left) to roll sideways, you push the rudder stick in the *opposite* direction. In other words, if you push *right* with the ailerons (once you are sideways on), you need to push *left* with the rudder to hold top rudder. Go *left* with ailerons and you need *right* (top) rudder. The two sticks either push *away* from each other or push *towards* each other.

Stop here and don't read any further until you've really understood which way you need to push the rudder to achieve *top* rudder. If you don't understand, go back and read the top rudder bit again.

It might help to grab your transmitter and try this out with your fingers. It's much easier to physically do it than try to explain it. With a little "hands on" I hope that this opposite stick movement will become clear!

A Flight Simulator Might Help

You might want to go out and practice this or, even better, if you have a flight simulator, try it. Get to know the knife-edge from normal straight and level flight. A flight simulator sure helps because no matter what you do, or what mistakes and crashes you suffer, a simple keystroke will bring you a miracle: you didn't crash after all. (How many times would I have wished for such a miracle!) After but a few minutes at the computer you will be able to "educate" your fingers to put the "model" through its paces.

Happy landings! ■

ELECTRIC CONNECTION

by Mark Nankivil
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St. Louis, Missouri 63143
(314) 781-9175
nankmc@ibm.net

Electric Powered Models
A Beginner's Primer

I have had a few requests recently asking for ideas as to what would be a good first electric powered model and what motor should be used to achieve good performance. When you think about it, that is a very broad question (or questions) and is totally dependent on what the modeler is really trying to achieve and quite frankly, what they expect. What I want to do over the next couple of columns is to approach this group of questions in two ways. The first approach is to outline sources of information that are readily accessible to modelers. I won't get into the math and theory of motors, speed controllers and batteries as there is plenty of information on this from others who are far more qualified to speak on it than I. Keith Shaw, Ken Myers, Bob Boucher, Matt Orme, Tom Hunt, Bob Kopski and others are fully qualified and have had years of experience with electric powered models. I decided back in college that if the classroom books couldn't agree on which way the electric current "flowed", then I wasn't going to do much better at figuring it out myself. I'm a civil engineer by education and trade and I'll be more than happy to tackle structural, fluid and hydraulic design, but I'll leave electrical design and theory to others. I have found that the electric model software available today is very helpful in working out workable motor/cell/prop combinations. What I will do though is outline the best sources of information and follow this up with some suggestions on model/motor combinations that I have used or have seen used that will help you build a great flying model the first time out.

Electric models have truly matured over the last 10 years and the variety of motors, models and accessories available today is mind numbing when compared with what was on the market just 10 years ago when the second F3E (new F5B) Electric World Champs were held here in the U.S. of A. in 1988. I flew my first electric way back in '85 and have been collecting books, articles, magazines, etc., since the beginning. It's been fun and quite enlightening to go back through all of this while I was doing my research. Believe me, what we have readily available today was simply not dreamed of in the mid '80s! In the last few years, brushless motors have become available and have in fact dominated the last 3 or 4 F5B World Championships (F5B is the FAI class for electric powered sailplanes). Aveox, MaxCim and AstroFlight are the U.S. makers of this type of motor and their European counterparts are companies such as Kontronik and Plettenberg. Brushless motors are the Cadillac of electric motors at present with the price tag to match. I have an Aveox F7LMR motor which is a brushless, geared motor suitable for 7 to 12 cell operation and the performance of this motor is awesome, especially compared to my AstroFlight geared FAI 05 motors. If you ever get the chance to see a 27 cell F5B model in action, do so as it is utterly impressive to see and really defines the term "high performance". Imagine a model that is the general size of a R/C HLG, packed with 27- RC2000 cells and a motor capable of producing over two horsepower/1600 watts, climbing and accelerating in the vertical. And yes, they even thermal! Most of us though are going to be flying electrics in the 6 to 14 cell range and I'll use that as the basis for upcoming columns.

Some of you are interested in the theory and design aspects of motors, speed controllers and cell counts and what happens when you put all of this to use turning a propeller to fly our models. A primary source for this information is the *Electric Motor Handbook* by Bob Boucher. Bob is the proprietor of AstroFlight, Inc., maker of a fine line of cobalt and brushless motors and related accessories. This is a softbound book that covers:

- Basic Physics and Principles
- Calculating Motor Load Lines
- Determining Motor Constants
- Timing your Motor
- Selecting your Propeller
- Selecting your Speed Control
- Mechanical Drawings of Astro Motors
- Speed Torque Curves for Astro Motors

The information in this book will cover most anything you would want to know about brush type motors.

I have recently started to use ElectriCalc - an electric flight prediction software program that allows one to look at different motor/cell/propeller/airframe combinations and predict the flight times, climb rates and motor parameters of your proposed model set up. I have just ordered my own copy of the latest version of ElectriCalc and also have ordered MotoCalc, another electric flight prediction program. I'll give a brief evaluation in the next column. If anyone out there has used Aero*Comp, I would like to hear your impressions and evaluation of the program. The brief description posted on the New Creations R/C website leads me to believe it's a pretty useful program too, but I would like to hear some feedback from others.

Next time, we'll look at different ways to size motor and cell combinations for the purpose you as the builder has in mind. In the meantime, your homework is to look at some of the following websites or contact the manufacturers/suppliers directly for their catalogs/brochures. These will help in understanding what is out there and available both in terms of information and in products. 'Til the next time, enjoy!!

Good Health and Good Lift!!

Addresses & Websites:

Motor/Speed Controller Manufacturers

Aveox Electric Flight Systems
31324 Via Colinas, #103
Westlake Village, CA 91362
818/597-8915, www.aveox.com

AstroFlight, Inc.
13311 Beach Ave.
Marina Del Rey, CA 90292
310/821-6242, www.astroflight.com

MaxCim Motors, Inc.
57 Hawthorne Dr.
Orchard Park, NY 14127-1958
716/662-5651, www.maxcim.com

Kontronik
72108 Rottenburg-Hailfingen
Etzwiesenstr. 35/1
Germany
www.kontronik.com

Electronic Model Systems (EMS Jomar)
22605 E. La Palma Ave., Suite 516
Yorba Linda, CA 92887
714/692-1393, www.emsjomar.com

Castle Creations
1625 E. Drury Lane
Olathe, KS 66062
913/397-0813, pdelcast@idir.net

On Line Information Sources

EZONE - www.ezonemag.com

AMPEER/Ken Meyers - http://members.aol.com/kmyersefo/homepage.htm

Fil's Home Page - www.repairfaq.org/~filpg

Electric Flight Software Programs

ElectricCalc by SLK Electronics
2906 Charolais Drive
Greensboro, NC 27406
www.slkelectronics.com

Motocalc by Capable Computing, Inc.
8150 Concession 5, RR#3
Morrefield, Ontario
Canada N0G 2K0
www.motocalc.com

Aero*Comp (available from New Creations RC)

Electric Model/Component Suppliers

Hobby Lobby
5614 Franklin Pike Circle
Brentwood, TN 37027
615/373-1444, www.hobby-lobby.com

New Creations R/C
P.O. Box 496, County Line Rd.
Willis, TX 77378
409/856-4630, www.newcreations-rc.com

Model Electronics Corp.
14550 20th Ave. NE
Seattle, WA 98155
206/440-5772, FAX - 206/440-5905

Bill Griggs Models
3137 Whitelaw Road
Canastota, NY 13032
315/697-8152, www.aiusa.com/bgriggs

Cermark
107 Edward Ave.
Fullerton, CA 92833
714/680-5888, www.CERMARK.com

Modelair-Tech
P.O. Box 1467
Lake Grove, NY 11755-0898
516/981-0372, www.modelair.com

Spirit of Yesteryear
40 Holgate St.
Barrie, Ontario, Canada L4N 2T7
705/737-0534

Tim McDonough
127 S. Oaklane Road
Springfield, IL 62707
http://web.inw.net/~il_tpm/

Acer Racing
P.O. Box 5680
Santa Monica, CA 90409-5680
310/775-6435, www.acerracing.com

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BOOK REVIEW

"Sailplanes by Schweizer A History"

by Jim Gray
Payson, Arizona

Among life's great pleasures are happy memories... And there have been none more pleasant for me than those associated with sailplanes, soaring, and soaring people. This superb new book by Paul Schweizer and Martin Simons vividly refreshes my personal recollections of the different Schweizer sailplanes I flew, and of the Schweizers themselves - the family which designed, built and also flew them.

Memories... Memories... And a story to go with each...

From 1957 to 1973 I flew full-size sailplanes from famous Harris Hill near Elmira, New York. Among them were a much-modified "bunny-nose" LK-10A (an ex-military Laister-Kauffman TG-4A), a Cherokee II, and a Briegleb BG-12BD. The Schweizer sailplanes included a club-owned ex-military TG-3A in which I began the conversion from power pilot to sailplane pilot, my own 1-20, various club-owned 1-26, 2-22, 2-32, and 2-33 sailplanes; and my own 1-23D, a jointly-owned 1-23H15, and a 1-34. The club sailplanes were operated by the members of HHSC - the Harris Hill Soaring Corporation - which managed the soaring operation on Harris Hill — a County - owned facility.

The full-page photo of the Schweizer 1-20 on page 73, jogged a happy recollection.

Back in the summer of 1957, I bought a Schweizer 1-20 (N2708A) - one of only three in existence - from three pilots from New Jersey. Their club had bought an old Schweizer 1-19 with its steel-tube fuselage and tail surfaces, but wanted more performance than this basic sailplane could yield, so they bought a set of Schweizer plans and built a 43-foot, slightly-tapered wooden wing. After tiring of its still-modest 20:1 glide ratio, in spite of the 'improvements', they brought it to Harris Hill where it became mine. Bill Hoverman, owner of a sleek Schweizer 1-23D, looked at the sky-blue 1-20, and laughed, saying, "Now there's the funniest blue auk I've ever seen!" Of course the name stuck, so Dale Gustin - fellow pilot, glider instructor, and artist - painted a silly-looking bird and the name 'Blue Auk' on each side of the glider's nose. You'll see that 42-year-old piece of framed fabric with the Auk's picture at the top of page 74.

The Schweizer TG-3A on pages 48, 49, *et seq* reminded me of my transition from power pilot to glider pilot on Harris Hill.

In 1957, HHSC possessed only one glider: a big, heavy, and immensely strong ex-military TG-3A made in 1943. That great hunk of wood and metal could really soar if you could stay up long enough from a winch or auto-pulley tow to find a thermal. Otherwise, you soared the northwest ridge in the up-slope breeze as long as possible, hoping for a thermal to come by and let you "get away". Sometimes the ridge just wasn't "working" so the best you could do was make a few passes on the mile-long slope and land. HHSC didn't have a tow plane yet, so flights of five or ten minutes were common, and much longer if you were lucky.

The club's instructors gave power pilots about three hours dual in the TG-3 before 'turning us loose' for solo. Sometimes, we could persuade a Super Cub or Stearman to come up from the Elmira airport to give us an airplane tow... And that's how I managed to eventually acquire my "C" soaring badge, a few minutes at a time...

Then, as now, to qualify for a "Silver C" badge, you have to make a five-hour flight called "the long sit". On Harris Hill it was often done using a combination of slope and thermal lift when the ridge was 'working'. Even so, you had to be in constant view of an "official observer" on the ground. Unlike today's super sailplanes, it used to take many, many flights in a low-performance glider before connecting with the one day when you could make that single five-hour flight. After many tries, on one perfect day in May 1958, the Blue Auk and I sat on the ridge for five hours and twenty minutes, just as dusk settled on the field.

The Silver C also requires a 50-kilometer (32 mile) distance flight, so later that year the 1-20 and I tried several abortive attempts (8 miles and 22 miles) for the badge flight; but didn't quite make it that year.

A year later, I completed the Silver C distance in my Cherokee II, a home-built wooden sailplane designed by Lockheed engineer Stan Hall, and thus fulfilled the FAI requirements for Silver C badge number 1486.

The Gold and Diamond badges always take longer to accomplish because of their stringent requirements of distance and altitude... So it took me another 13 years to complete the 300 kilometer (186-mile) Gold Distance and Diamond Goal flights. Another picture and another page in the *Book* will suffice to recall that memory as if it were yesterday.

On page 93 you'll see the beautiful Schweizer 1-23D, an old but delightful-to-fly all-metal soaring machine that had been flown by many pilots to altitude and distance records here in the United States.

My own 1-23D, acquired years later, had been modified with a larger canopy and more cockpit space for comfort on long flights, and had some advanced soaring instruments. Even so, badge flights depend on pilot judgement and skill as well as instrumentation. On Labor Day weekend in 1971, I flew the 1-23D from Harris Hill to Asbury Park, New Jersey - a distance of about 212 miles in six hours.

Have a look at pages 85 and 173 and see what the Schweizer 2-22 and 2-33 training sailplanes looked like.

Between the few and far-between badge flights, I flew students and passengers on instructional and sight-seeing flights in the club's single 2-22 and its several 2-33s, accumulating several hundred hours of dual and solo 'glider' time. Finally, in 1973, 16 years and 996 flights after beginning my soaring career, I reluctantly and regretfully sold my last sailplane, a Briegleb BG-12BD, an all-wood, home-built machine of about 34:1 glide ratio, a respectable performance in the days when fiberglass "orchids" were just beginning to replace the older sailplanes. And so it was that Schweizer sailplanes made a lifelong impression on my head and my tail!

THEN... I began R/C soaring, another "fun" story entirely...

"Sailplanes by Schweizer" is also a well-documented HISTORY of the company, its founders and the 2,170 sailplanes, gliders and sailplane-based powered aircraft they built. Written by Paul Schweizer, the "middle" one of the three founding-family members, with Martin Simons, the text, drawings and photographs are contained in a large 8-1/2" x 12" 'coffee-table-sized' volume of 224 pages. The book bulges with dozens of outstanding full-page black-and-white photographs of every Schweizer glider and sailplane ever built, many of them presented here for the first time. Martin's exquisitely rendered and accurately-dimensioned full page three-views, plus photos and descriptions in the text, provide most of the needed information to assist you in building a superb scale model... But they also pose a dilemma: which one to build? Almost ANY one of those covered in the book would make a unique, and perhaps never-before-modeled contribution to RC scale soaring. You will also find some rare and detailed cockpit and instrument panel photographs.

There are dozens of other photographs illustrating the various Schweizer sailplanes in flight and rest, frequently accompanied by the pioneer and well-known pilots who flew them. There are photographs of the first, second and third generation Schweizer family members, representing the only U.S. aircraft manufacturer that remains in the hands of the same family from the beginning of its existence to the present day.

For the model builder as well as historian, *"Sailplanes by Schweizer"* is a reliable and thoroughly documented source of information about every Schweizer sailplane and glider ever built. The text is replete with personal anecdotes from Paul Schweizer, retired CEO and manufacturing manager of Schweizer Aircraft Corporation. He tells of how the young brothers, Ernie, Paul and William, built their first glider - the 1-1 in 1930. Ernie, the eldest - then in high school - was the designer and chief constructor. The 'factory' was a loft in the barn on the "Papa" Schweizer's farm "Bonnie Brook" in Peekskill, New York, where *Reader's Digest*™ and IBM™ live today.

Did you know that Schweizer built POWERED aircraft and helicopters as well as sailplanes?

Just look at page 151 and following, to see the SA-1-30 and SA-2-31 which were single and two-place, all-metal, low-wing powered aircraft which - except for the time - COULD have been as popular as Cessnas and Pipers. They were good-looking and good flyers, but the economy wasn't ready for them; time passed them by.

One of my favorite photos bridges pages 163 and 164, showing the three Schweizer

brothers sitting in their 1000th sailplane: a Schweizer 3-place 2-32. Then, there's the photo bridging pages 194 and 195 which shows the 3 "younger" (Leslie, Stuart, Paul H.) and the 3 "older" (Ernie, Paul A. and William) Schweizers, posed with the company's 2000th sailplane: the SGS 1-35, a competition machine capable of keeping up with any of the best of its class in the world at the time.

Page 208 is a three-view of the SGM 2-37 Motor Glider, a side-by-side two-place machine of extraordinary performance and capability, built for the U.S. Air Force Academy. And last, but not least, on page 214, the remarkably beautiful, long-winged SA 2-37A surveillance aircraft powered by a 250 h.p. turbocharged engine, a design just longing to be built by a scale modeler for an unusual and potentially winning design.

The appendices of the book include the Schweizer sailplane numbering system, the Schweizer sailplane 'family' (shows each model production year and number manufactured), a note about the drawings, and aerofoils.

"Sailplanes by Schweizer, A History" is available from:

Raul Blacksten
P.O. Box 307
Maywood, CA 90270
e-mail: raulb@earthlink.net
http://home.earthlink.net/~raulb

Specialty Press
11481 Kost Dam Rd.
North Branch, MN 55056
(612) 583-3239

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Pasadena Soaring Society Contest Announcement

The Pasadena Soaring Society (PSS) invites one and all to attend their Eighteenth Annual, Two-Day Rosebowl Soaring Festival. This event will take place on May 1st and 2nd in Pasadena, California in the shadows of the world famous Rosebowl. Seventeen acres of grass, clear skies, and lots of thermals will help make your stay enjoyable. Open and Two-Meter competition. Entry forms are available on the Pasadena Soaring Society's web site which can be reached via http://www.rcsoaring.com, which includes PSS within the Club links in Southern California. Contest Director, Richard Burns, can be reached at (626) 857-0024 for more information or an entry form. ■

Hobby Shops that Carry RCSD

Gunnings Hobbies
550 San Anselmo Ave.
San Anselmo, CA 94960
(415) 454-3087

Gyro Hobbies
23052 Lake Forrest Dr.
Unit C2
Laguna Hills, CA
(714) 583-1775

Gyro Hobbies 2
17431 Brookhurst Unit H
Fountain Valley, CA 92708
(714) 378-8924

Hobbies"N Stuff
9577-L Osuna Rd. NE
Albuquerque, NM 87111
(505) 293-1217

Hobby Town U.S.A.
8060 S. 84th St.
La Vista, NE 68128
(402) 597-1888

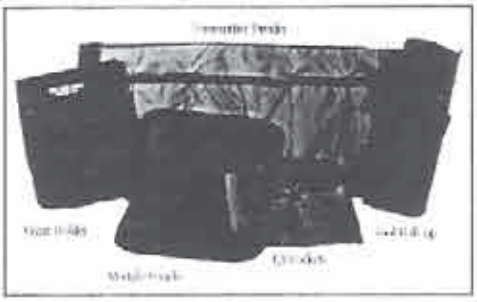
Hobby Warehouse
4105 South Street
Lakewood, CA 90712
(562) 531-8383

King R/C
Five Forks Village
King, NC 27021

Tim's Bike & Hobby
2507 Broadway
Everett, WA 98201
(206) 259-0912

NEW PRODUCTS

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



Bags & Accessories
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The Bag Lady manufacturers wings & fuselage bags, transmitter totes, and tote accessories, which include transmitter divider, module pouch, shoulder strap, CA pockets, tool roll-up, cigar holder, and velcro key ring.

For additional information, and custom orders, contact Albert Wedworth, "The Bag Lady", at 4 Brittany Lane, Chico, CA 95926; (888) 457-1550, <albertw104@aol.com>. ■

MARKET PLACE LISTINGS

VACUUM FORMED PRODUCTS, CANOPIES
Viking Models, U.S.A.
2 Broadmoor Way
Wylie, TX 75098
(972) 442-3910 • fax (972) 442-5258
RCSDigest@aol.com

Closet Scale Stuff
At Sailplanes Unlimited. Ltd.

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

1/4.2 FiberClassics Nimbus 4 - 6.28 meter span (246"), wing profile E 68-66, ca. 18 lbs.

1/3.6 Roedelmodell DG 800 - 4.15 meter span (163"), wing profile E 207, ca. 11 lbs.

1/3.75 Roedelmodell Fox MDM-1 - 3.8 meter span (149"), wing profile RG 12, ca. 15 lbs.

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

Please call for additional info: (212) 879-1634.

SVSS

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CONTACT
Jim Thomas
(916) 984-5123
jamesthomas@aerojet.com
or visit: www.svss.org

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(402) 796-2175
paulw@isco.com

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4TH ANNUAL

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Emphasis will be on fun and aerotowing. Tow planes and experienced pilots will be available to tow you to altitude. Bring your 3 meter (118") or larger sailplanes, fitted w/ allerons and tow release, and join the fast growing aerotow movement. Scale Motorgliders will be welcome at this event as will non-scale large sailplanes fitted with tow releases.

Pilots' choice awards include Vintage & Modern sailplanes, and tugs. Proof of 1999 MAAC or AMA membership is required, along with gold sticker radios. Meals and accommodation are available nearby in Dunnville. Registration fee: $12 ($10 US)

For information package & map contact:

Phil Landray, (905) 468-3923
Linden@niagara.com
Gerry Knight, (905) 934-7451
Lou Kleiman, (905) 688-4092
Mistral@niagara.com

ZIKA

Advertising Note

Please note that the cut-off date for classified & display ads is the 15th of the month.

1999 MONTAGUE CROSS COUNTRY CHALLENGE

Location -	Siskiyou County Airport, Montague, CA
Date -	June 10th & 11th - Practice and LSF Task Days June 12th & 13th - Contest Days
Time -	Pilots meeting at 9am, flying begins at 10pm
Task -	Free Distance within a prescribed course
Classes -	Open and Sportsman (3.2 meter wingspan or less)
Rules -	All sailplane pilots must be AMA members. The team will decide who and how long each pilot flies the sailplane. Sailplanes must be winch launched. There will be unlimited attempts allowed, no relaunching on course. Each sailplane must be identified with the last 3 numbers of the team captain's AMA number. The numbers must be 3" high and placed both sides of the vertical fin.
Prizes -	Plaques will be given to 3 members of the top 3 finishing teams in each class.
Entering -	Entry fee is $60 per team, each team will receive 3 event T-Shirts, and 3 tickets to a Saturday night BBQ. All entries must be received by May 9th, 1999. There will be a limit of 20 teams, so don't delay.
Lodging -	Camping is available on-site, no services available. Motels are available in Yreka, approximately 12 miles away.
Info -	For additional info please call Dean, Scott, or Randy at (541)899-8215 days, or Dean (541)899-7034 evenings, or e-mail us at dgair@cdsnet.net

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(Pre-registration required by May 13)

AMA Sanctioned!

A full weekend of R/C hand-launch action sanctioned by the AMA and Eastern Soaring League (ESL).

Eastern Soaring League!

For more information and registration:

http://marina.fortunecity.com/greenland/238/index.htm
John Appling 410/374-2463 -or- JAppling@qis.net

SCHEDULE OF SPECIAL EVENTS

April 10
Cross Country Challenge — Lancaster, CA
Gary Fogel, gliderrc@aol.com

April 24
NASF Unlimited — Huntsville, AL
Rob Glover, (256) 883-2988

April 24
Thermal Fun Fly (Scale) — Southern CA
Stan Sadorf, (760) 245-6630
soareyes@aol.com

April 24-25
Aircombat '99 — Los Banos, CA
Michael Heer, Fixostar@aol.com
(209) 951-2902 (eve)

April 24-25
SKSS Unlimited — Newark, DE
John Kirchstein, kirchste@voicenet.com
(302) 731-2831

May 1-2
Rosebowl Soaring Festival — Pasadena, CA
Richard Burns, (626) 857-0024
http://www.rcsoaring.com

May 7-9
Fayetteville Airtow Fly-In — Fayetteville, NC
Wayne Parrish, (919) 362-7150 (after 9 pm)
Bernie Coleman, (704) 846-5219

May 8-9
TMSS Unlimited — Southern VA
Josh Glaab, ljglaab@pinn.net
(757) 850-3971

May 15-16
BASS HL — Frederick, MD
John Appling, jappling@qis.net
(410) 374-2463

May 15-16
Gateway Soaring Open, MVSA — St. Louis, MO
Mark Nankivil, nankmc@ibm.net
(314) 781-9175

May 15-16
Torrey Pines Scale Soaring Classic — Poway, CA
Gary Fogel, gliderrc@aol.com

May 14-16
Midwest Slope Challenge — Lake Wilson, KS
Paul Wright, (402) 796-2175
paulw@isco.com

May 22-23
ESL Fun Fly — Newark, DE
John Hauff, tankman58@aol.com
(718) 767-1369

May 22-23
Spring Fling — Sacramento, CA
Jim Thomas, (916) 984-5123
james.thomas@aerojet.com, www.svss.org

May 22-23
Memorial Contest - CSS, OVSS#1 — Cincinnati, OH
Duane Bently, Duane.Bently@ae.ge.com
(513) 777-5491

May 29-30
CAF's 2M, Unlimited — Tullahoma, TN
Kendall McDonald, (931) 455-5779

June 5-6
LOFT Weekend (2M, Unl, RES), OVSS#2 — Ft. Wayne, IN
Bob Steele, lstpres@aol.com, (219) 485-1145
Mike Remus, (219) 485-6453

June 5-6
CASA-2M — Near D.C.
Chris Bovais, bovais@kahuna.nrl.navy.mil
(703) 643-5513

June 10-13
Elmira Aerotow '99 — Elmira, NY
John Derstine, johnders@postoffice.ptd.net
(717) 596-2392

June 10-13
Montague Cross Country Challenge — Montague, CA
DG Airparts, Inc., dgair@cdsnet.net
(541) 899-8215

June 12-13
Land of Lincoln Electric Fly — Springfield, IL
Tim McDonough, tim@mcdonough.net

June 19-20
LISF Open — Long Island, NY
John Hauff, tankman58@aol.com
(718) 767-1369

June 24-27
MSSC '99 (Incl. XC) — Huntsville, AL
Ron Swinehart, (256) 722-4311 (days)
(256) 883-7831 (eve), on.swinehart@lmco.com

June 26
LOFT Electric Contest — Ft. Wayne, IN
Class A - LMR,& Battery Allotment, Class B - LMR, & Battery Allotment
Pat Mattes, Pat-Ingrid-Mattes@juno.com
(219) 478-7302

June 26-27
ESL-F3J — Long Island, NY
Tom Kiesling, kiesling@ctc.com
(814) 255-7418

June 27
LOFT HL Contest (Open, JR/SR Comb.) — Ft. Wayne, IN
Jerry Shope, (937) 843-5085

July 10-11
LASS Open — Lancaster, PA
John Murr, jmurr@redrose.net
(717) 285-7025

July 10-11
Nats Warm Up - LASS, OVSS#3 — Louisville, KY
Ed Wilson, ewilson1@bellsouth.net
(502) 239-3150

July 10
CAF's 2M & Unlimited — Tullahoma, TN
Herb Rindfleisch, herb@cafes.net
(931) 455-1836

July 24-31
AMA NATS — Muncie, IN
24th: Sport Scale Sailplane, F3B, XC
25th: F3J
26th: HL
27th-28th: 2M
29th-30th: Unlimited
31st: NOS & RES

August 7-8
MVSF — Princeton, NJ
Bill Miller, jerseybill@worldnet.att.net
609-585-6779

August 13-15
GNATS Aerotow '99 — Ontario, Canada
Phil Landray, (905) 468-3923,
linden@niagara.com
Gerry Knight, (905) 934-7451
Lou Kleiman, (905) 688-4092,
mistral@niagara.com

August 14-15
CRRC Open — Boston, MA
Fritz Bien, fritz@spectral.com
(508) 369-1720

August 14-15
DARTS Man-on-Man Challenge, OVSS#5 — Yellow Springs, OH
Bob Massmann, rmassmann@in-touch.net
(937) 382-4612

August 21-22
BASS Open — Frederick, MD
Jack Cash, jcashjr@cyberun.net
(301) 898-3297

August 21-22
Mid-American Championships — Lexington, KY
Bluegrass Soaring Society, OVSS#6
Buzz Bruszewski, 76722.3421@compuserve.com
(606) 382-4612

August 28-29
SKSS Open — Newark, DE
John Kirchstein, kirchste@voicenet.com
(302) 731-2831

September 4-5
LOFT/OVSS Fall Round Up (2M, Unl, RES) — Muncie, IN
Marc Gellart, isoar2@wcoil.com
(419) 229-3384

September 11-12
CASA Open — D.C.
Steve Lorentz, lorentz@fred.net

September 18-19
LISF-2M — Long Island, NY
Gordon Stratton, (718) 847-8299

September 25-26
ESL End of Season — Reading, PA
T. Kiesling/J. Glaab, kiesling@ctc.com
(814) 255-7418

September 18-19
CAF's 2M & Unlimited — Tullahoma, TN
Herb Rindfleisch (Sat.), herb@cafes.net
(931) 455-1836
Chuck Anderson (Sun.), canders@edge.net
(931) 455-1836

October 9
NASF Unlimited — Huntsville, AL
Lars Ericsson, lars_ericsson@atk.com
((256) 859-0255

Classified Advertising Policy

Classified ads are free of charge to subscribers provided the ad is personal in nature and does not refer to a business enterprise. Classified ads that refer to a business enterprise are charged $5.00 per month and are limited to a maximum of 40 words. The deadline for receiving advertising material is the 15th day of the month. (Example: If you wish to place an ad in the March issue, it must be received by February 15.) *RCSD* has neither the facilities or the staff to investigate advertising claims. However, please notify *RCSD* if any misrepresentation occurs. Market Place Listings are $5 a month. Personal ads are run for one month and are then deleted automatically. However, if you have items that might be hard to sell, you may run the ad for two months consecutively.

For Sale - Business

PC-Soar Version 3.7 Sailplane Performance Evaluation Program with Airfoil and Sailplane Library expanded to 60 models including Chrysalis, Anthem, Genesis, Peregrine, Probe, Thermal Eagle, and Spectrum. Airfoil library includes 322 polars with 56 UIUC polars. PC-Soar with Libraries of Sailplanes and Airfoil Polars plus a new Excel utility for working with multi taper wing areas and aerodynamic centers. Reduced Cost: $50 + $3 P&H. PC-Soar library and software Upgrade to Ver. 3.7: $10 + $3 P&H. L|M Associates, 1300 Bay Ridge Rd., Appleton, WI 54915; ph: (920) 731-4848 after 5:30 p.m. weekdays or on weekends. E-mail: lmurray@athenet.net. PC-Soar Web Page: <http://www.athenet.net/~atkron95/pcsoar.htm>.

PRECISION AMAP WING CUTTER, replacement parts, and service. AMAP Model Products, 2943 Broadway, Oakland, CA 94611. Butch Hollidge, (510) 451-6129, or fax (510) 834-0349.

A.M.P. Aerial Model Products, sport, slope, race prototypes - all airfoils. 60" Del Valle Snake, 94" H&K Cobra, AMAP Flair, Kevin Cutler's full house Davenport Monitor. All race tested. Butch Hollidge, (510) 680-0589, eve, California.

PARACHUTES: $10. Dale King, 1111 Highridge Drive, Wylie, TX 75098; (972) 475-8093.

Custom Cut FOAM WING CORES. White, pink, blue, and Spyder foam available; most airfoils available. Send copy of drawing for quote. Viking Models, U.S.A., 2 Broadmoor Way, Wylie, TX 75098; (972) 442-3910, fax (972) 442-5258.

For Sale - Personal

1/4 Roedel Super Cub (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. Contact Robin Lehman, 63 E. 82nd St., New York, NY 10028; (212) 879-1634.

Infinity 600, new '98... $300.00; Falcon 880, new 7037 wings w/4 servos... $350.00; 2M Banshee, 7037 wings w/6 servos... $300.00. Add shipping. Bill, (972) 699-3998, Texas.

FVK Silent Dream 2.2 electric sailplane, white gelcoat fuse w/2 piece built-up wings (Wings are a work of art.), plane flies beautifully using 1 elevator & 2 aileron servos, currently set up for geared Astro 05, perfect condition... $195.00 + shipping. Keith, (408) 982-5244, <kglass@cusa.canon.com>.

1:4 Grob 103 Twin Acro, new... $650 + S&H; Opus, NIB; all moulded HLG, 60", RG-15, new... $240; all molded F3J, RG-15, new... $550. Fuselage: L-23 Super Blalik; DG-600; Pilatus B-4; Ventus; Grob 103 Twin Acro; Discus; ASW 24; ASH 26; Opus; Graupner 1:4 Grob 103 Twin Acro; cockpit & canopy EMS DG-800. Peter Zak, (305) 687-7706, (954) 290-3759, Florida.

Please send in your scheduled events as they become available!

For detailed information on events outside of the U.S.A., please view www.sailplanes.com event schedule.

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 (NASF), Ron Swinehart, (256) 722-4311, <ron.swinehart@lmco.com>, or Rob Glover at AMA3655@aol.com, http://sh1.ro.com/~samfara/

Alabama - Central Alabama Soaring Society, Ron Richardson (Tres.), 141 Broadmoor Ln., Alabaster, AL 35007, <ron_mail@bellsouth.net>.

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

Arizona - Aerotowing, slopesites in AZ (rugged), Arizona Flying Eagles R/C Demo. Show Team, Dave Wenzlick, (602) 345-9232, <azdw@uswest.net, or visit CASL at <http://www.public.asu.edu/~vansanfo/casl>.

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

Arizona - Southern Arizona Glider Enthusiasts, Bill Melcher (contact), 14260 N. Silwind Way, Tucson, AZ 85737; (520) 825-2729. 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 - DUST, Buzz Waltz, 68-320 Concepcion, Cathedral City, CA 92234, (760) 327-1775.

California - High Desert Dust Devils, Stan Sadorf, 14483 Camrose Ct., Victorville, CA 92392; (760) 245-6630, <Soareyes@aol.com>.

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 - Sacramento Valley Soaring Society, Dudley Dufort, 225 30th St., Suite 301, Sacramento, CA 95816, (916) 448-1266, <www.svss.org>.

California - South Bay Soaring Society, Mike Gervais, P.O. Box 2012, Sunnyvale, CA 94087; (408) 683-4140 (H), (650) 354-5469 (W).

California - Southern Calif. Electric Flyers, John Raley (President), 1375 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), Tom Kiesling (Pres./Editor), (814) 255-7418, kiesling@ctc.com; Ben Lawless (Sec./Tres.), LawlessB@ang.af.mil; Anker Berg-Sonne (Scorekeeper), (508) 897-1750, anker@ultranet.com; Josh Glaab (Contest Coordinator), (757) 850-3971, jglaab@pun.net; <http://www.eclipse.net/~mikel/esl/esl.htm>.

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), Jerre K. Ferguson (Pres.), 4511 Pageant Way, Orlando, Ft. 32808, (407) 295-0956, <jerre@bellsouth.net>.

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

Hawaii - Maui Island Slope Soaring Operation (MISO), Duane A.K. Asami, 262 Kamila St., Kula, HI 96790, pgr. (888) 932-6247, <dasami@mauigateway.com>.

Illinois (Chicago Area) - Silent Order of Aeromodeling by Radio, Jim McIntyre, 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744. Bill Christian, 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (847) 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.

Indiana - League Of Flight by Thermal (LOFT), Ft. Wayne, IN based soaring club, LOFT supports RC soaring activities for pilots in northeast Indiana and northwest Ohio; Marc Gellart, (419) 229-3384, <isoar2@wcoil.com>, <www.rc-aero.com/LOFT>.

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

Iowa - Eastern Iowa Soaring Society (Iowa, Illinois, Wisconsin, Minnesota), Ed Harris (Editor), 2000 NW 84th Ave., Ankeny, IA 50021; (515) 965-5942, <harris.edwin@mcleodusa.net>.

Kansas - Kansas Soaring Society, 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 <ewilson1@bellsouth.net>.

Louisiana - Capitol of Louisiana Soaring Society (CLASS), Leonard Guthrie (contact), 12464 Fair Hope Way, Baton Rouge, LA 70816, (504) 275-2122.

Maine - DownEast Soaring Club (New England area), <Jim.Armstrong@juno.com>.

Maryland - Baltimore Area Soaring Society, Erich Schlitzkus (President), 52 North Main St., Stewartstown, PA 17363; (717) 993-3950.

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

Massachusetts - Charles River Radio Controllers, Dick Williamson (past president), 21 Pendleton Road, Sudbury, MA 01776; (781) 981-7857 (W), <williamson@ll.mit.edu>, <http://www.charlesriverrc.org>.

Michigan - Greater Detroit Soaring & Hiking Society, Greg Nilsen (Sec.), 260 Rosario Ln., White Lake, MI 48386-3464; (248) 698-9714, GNilsen624@aol.com.

Michigan - Great Lakes 1.5m R/C Soaring League & "Wings" Flight Achievement Program & Instruction. Ray Hayes, 58030 Cyrenus 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 149 E1, Lexington, NE 68850, (308) 324-3451/5139.

Nebraska - Lincoln Area Soaring Society (Wilson Slope Races), Jim Baker, 920 Eldon Dr., Lincoln, NE 68510-4014, (402) 483-7596, <http://www.geocities.com/CapeCanaveral/Hangar/1671/lass-2.html>.

Nebraska - SWIFT, 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) 643-2524, <abergst@neb-sandhills.net>.

Nevada - Las Vegas Soaring Club, Jim Allen (President), 7117 Caprock Cir., Las Vegas, NV 89129; ph (702) 658-2363, fax (702) 658-1996.

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

New Mexico - Albuquerque Soaring Association (all soaring & electrics), Jim Simpson (contact), 604 San Juan de Rio, Rio Rancho, NM 87124; (505) 891-1336, <jimboree@aol.com>, <http://www.abqsoaring.com>.

New York, aerotowing Rochester area, Jim Blum and Robin Lehman, (716) 335-6515.

New York - Elmira - Harris Hill L/D R/C, aerotowing & slope, John Derstine, (717) 596-2392, e-mail johnders@postoffice.ptd.net.

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 perryl@sstaff.sunyerie.edu; Jim Roller (Competition Coordinator), (716) 937-6427.

New York - Long Island Silent Flyers, Stillwell Nature Preserve, Syosset, NY, Ze'ev Alabaster (President), (718) 224-0585, or Peter DeStefano (VP), (516) 586-1731.

New York - Syracuse area, Central NY Sailplane Group, Dave Zinteck, Minoa, NY, (315) 656-7103, e-mail Zinteck@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, (253) 874-2429 (H), (206) 655-1167 (W).

Ohio - Cincinnati Soaring Society, Ed Franz, 7362 Ironwood Way, Burlington, KY 41005; (606) 586-0177, <ejfranz@fuse.net>.

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@iwaynet.net>.

Ohio, Kentucky & Indiana - Ohio Valley Soaring Series, Marc Gellart, (419) 229-3384, <isoar2@wcoil.com>, <www.dma.org/DARTS/ovss/ovss.html>.

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, www.europa.com/~patch/

Oregon - Salem Soaring Society, Al Szymanski, CD, (503) 585-0461, http://home.att.net/~aszy/sss/> for club's home page.

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 Sowder, 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 Sengbush, (972) 291-4840.

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

Vermont - Steve Savoie, 926 Gage St., Bennington, VT 05201, (802) 442-6959.

Virginia - Blue Ridge Area Soaring Society (Central Virginia - Waynesboro), Tom Broeski, (540) 943-3356, <tjb@rica.net>.

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 & Pennsylvania - Tri-State Soaring, Chip Vignolini, 2784 Mill St., Aliquippa, PA 15001; (724) 857-0186, Voice mail (412) 560-8922, <ydne30a@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; (920) 731-4848, <lmurray@athenet.net>.

Outside U.S.A.

Australia - Southern Soaring League, Inc., Mike O'Reilly, Model Flight, 42 Maple Ave., Keswick SA 5035, Australia. Phones: ISD+(08) 8 293-3674, ISD+(08) 8 297-7349, ISD+(018) 8 082-156 (Mobile). FAX: ISD+(08) 8 371-0659.

Canada - Montreal Area - C2VM Glider Club, Jacques Blain (President), days (514) 443-5335, eve. (514) 652-6167.

Canada - Greater Niagara Area Thermal Soarers (GNATS), Flat Field Soaring & Aerotowing, Gerry Knight, (905) 934-7451 or Don Smith, (905)934-5815.

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 (CIAM Flyer), Jack Silc (Editor), 21 Bures Close, Stowmarket, Suffolk, IP14 2PL, England; Tele. # 0449-675190.

England (southwest) - Sean Walbank, Woolcombe 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, yanr@asiaonline.net.

Japan - Dr. Paul "Sky Pilot" Clark, 2 - 35 Suikoen Cho, Hirakata Shi 573, Osaka Fu, Japan; IAC+(81) 720-41 2934, <pclark@osk3.3web.ne.jp> http://www3.osk.3web.ne.jp/~pclark/skypilot/

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

RCSD Index/Database

Available from: <http://www.athenet.net/~atkron95/pcsoar.htm>. Or, send 3.5" high density disks & SASE with stamps for 2 oz. Lee Murray, 1300 Bay Ridge Rd., Appleton, WI 54915; (920) 731-4848 after 5:30 pm weekdays or on weekends, <lmurray@athenet.net>.

Reference Material

Summary of Low-Speed Airfoil Data - Volume 3 is really two volumes in one book. Michael Selig and his students couldn't complete the book on series 3 before series 4 was well along, so decided to combine the two series in a single volume of 444 pages. This issue contains much that is new and interesting. The wind tunnel has been improved significantly and pitching moment measurement was added to its capability. 37 airfoils were tested. Many had multiple tests with flaps or turbulation of various configurations. All now have the tested pitching moment data included. Vol 3 is available for $35. Shipping in the USA add $6 for the postage and packaging costs. The international postal surcharge is $8 for surface mail to anywhere, air mail to Europe $20, Asia/Africa $25, and the Pacific Rim $27. Volumes 1 (1995) and 2 (1996) are also available, as are computer disks containing the tabulated data from each test series. For more information contact: SoarTech, Herk Stokely, 1504 N. Horseshoe Circle, Virginia Beach, VA 23451 U.S.A., phone (757) 428-8064, e-mail <herkstok@aol.com>.

"Aerotow '97" Elmira!" video taken at the Annual Northeast Aerotowing Fly-in, New York. 56 minutes of great flying, interviews, pristine scale models, demos, full-scale as well as models, and rare vintage film from Harris Hill in the 1930's. Check or money order, $24.95 plus $3.00 S&H (U.S.), payable to John Derstine, RD 3# Box 336, Gillett, PA 16925; (717) 596-2392, <johnders@postoffice.ptd.net>.
S&H foreign: $6 Canada/Mexico, $7 Europe, $8 Asia/Africa, $8.50 Pacific Rim. VHS format, NTSC standard. PAL format $40 + applicable shipping.

BBS/Internet

Internet soaring mailing listserve linking hundreds of soaring pilots worldwide. Send msg. containing the word "subscribe" to soaring-request@airage.com. The "digestified" version that combines all 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.

Seminars & Workshops

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

Books by Martin Simons

"World's Vintage Sailplanes, 1908-45", "Slingsby Sailplanes", "German Air Attaché", "Sailplanes by Schweizer"

Send inquiries to: Raul Blacksten, P.O. Box 307, Maywood, CA 90270, <raulb@earthlink.net>
To view summary of book info.: http://home.earthlink.net/~raulb

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: 70773.1160@Compuserve.com

T.W.I.T.T.

(The Wing Is The Thing)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines. Full information package including one back issue of newsletter is $2.50 US ($3.00 foreign). Subscription rates are $18.00 (US) or $22.00 (Foreign) per year for 12 issues.

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

LSF

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

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

Send for your aspirant form, today:

League of Silent Flight
c/o AMA
P.O. Box 3028
Muncie, IN 47302-1028 U.S.A.

The Vintage Sailplane Association

Soaring from the past into the future! The VSA is dedicated to the preservation and flying of vintage and classic sailplanes. Members include modelers, historians, collectors, soaring veterans, and enthusiasts from around the world. Vintage sailplane meets are held each year. The VSA publishes the quarterly BUNGEE CORD newsletter. Sample issues are $2.00. Membership is $15 per year. For more information, write to the:

Vintage Sailplane Association
13312 Scotsmore Way
Herndon, VA 22071 USA

ESL

The Eastern Soaring League (ESL) is a confederation of Soaring Clubs, spread across the Mid-Atlantic and New England areas, committed to high-quality R/C Soaring competition.

AMA Sanctioned soaring competitions provide the basis for ESL contests. Further guidelines are continuously developed and applied in a drive to achieve the highest quality competitions possible.

Typical ESL competition weekends feature 7, or more, rounds per day with separate contests on Saturday and Sunday. Year-end champions are crowned in a two-class pilot skill structure providing competition opportunities for a large spectrum of pilots. Additionally, the ESL offers a Rookie Of The Year program for introduction of new flyers to the joys of R/C Soaring competition.

Continuing with the 20+ year tradition of extremely enjoyable flying, the 1999 season will include 14 weekend competitions in HLG, 2-M, F3J, F3B, and Unlimited soaring events. Come on out and try the ESL, make some new friends and enjoy camaraderie that can only be found amongst R/C Soaring enthusiasts!

ESL Web Site: http://www.eclipse.net/~mikel/esl/esl.htm

ESL President (99-00): Tom Kiesling (814) 255-7418 or kiesling@ctc.com

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THE CONDOR

SPECS:	
WING SPAN	112.5"
WING AREA	918 SQ. IN.
AIRFOIL	SD7035
WEIGHT	62-66 OZ.
WING LOADING	9.7 - 10.3 OZ./SQ. FT.

CONDOR

Tomorrow's Sailplane, Technology Today

The Condor is designed by Mark Allen, who is considered one of the best model sailplane designers in the United States, if not the world. Mark has taken all of his previous experience in competition thermal duration flying, plus all the knowledge he has gained from his earlier contest and sport designs, to design the Condor. Mark Allen's previous planes, to name only a few, are: Falcon 880 and 800, Falcon 600, Swift, Thermal Eagle, Vulcan, Night Hawk, Sky Hawk, Electric Hawk, Falcon 550E, Rocket, Pocket Rocket and, of course, the molded, world championship F3B Eagle. By taking the best of these designs and the new construction techniques available today, Mark has come up with, what we feel, is the absolute best open-class sailplane available.

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 obechi from Kennedy Composites, which is applied with West Systems epoxy. 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 hingeline. 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.

The Condor, designed by Mark Allen, wings by Ron Vann, fuselage by Steve Hug, and kitted by Slegers International, we feel, is the best open-class, thermal duration sailplane available, at an affordable price of $395.00 plus S&H.

★ VISA ★ MASTERCARD ★ DISCOVER ★

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Roedelmodell

1/4.5	ASK 21	E393	165" (4.2m)
1/3.6	Ka6E	E392	165" (4.2m)
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PriBeck

1/3	ASW27	HQ2.5/12	196" (5m)
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1/3	Fox	E 374 SD 6060-6062	183" (4.66m)

Czech these out!

All completely finished with retracts installed:

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1/3	ASW24	E203-201-193	196" (5m)
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very realistic **PILOTS** from 1/4 to 1/2.5

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