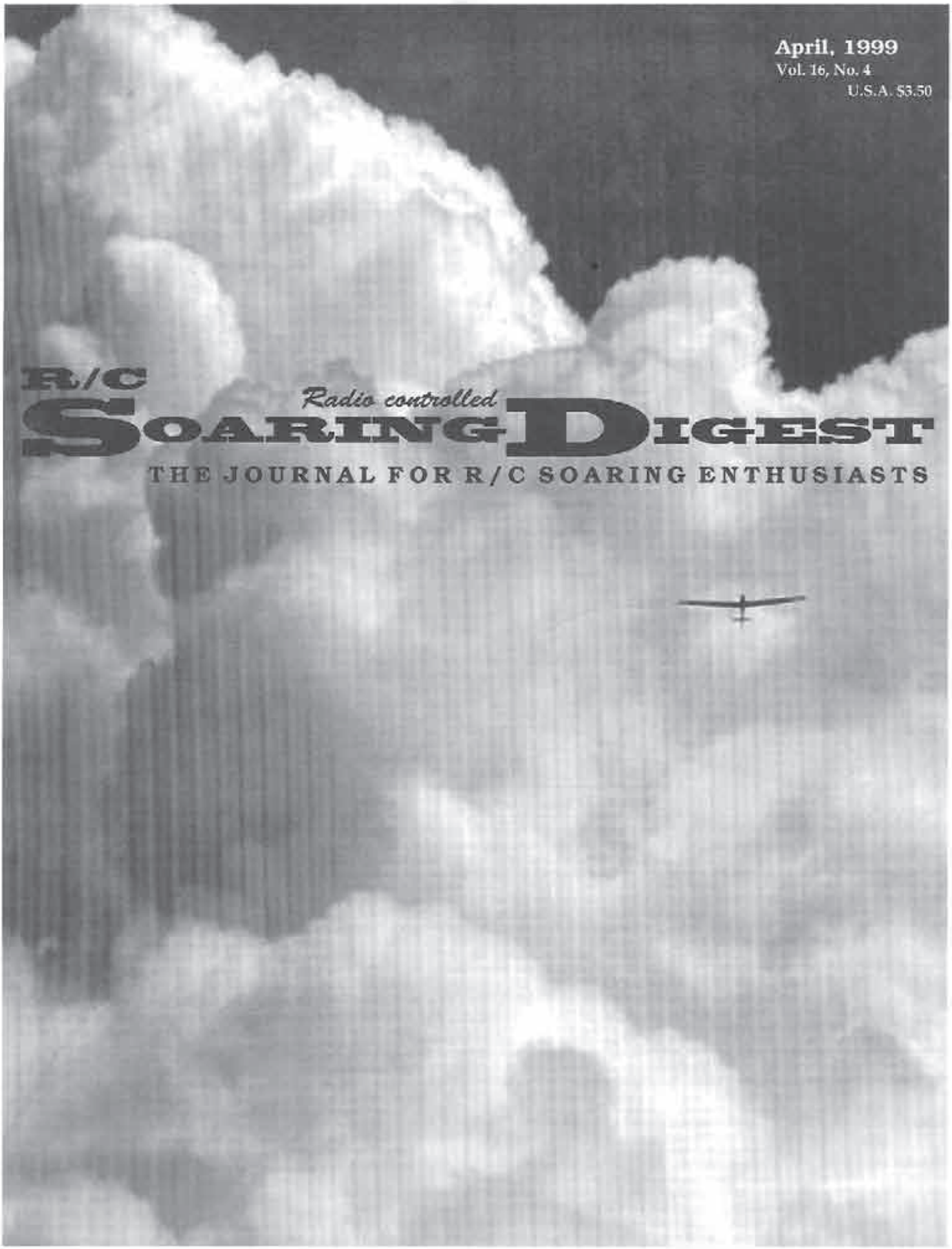
April, 1999
Vol. 16, No. 4
U.S.A. $3.50

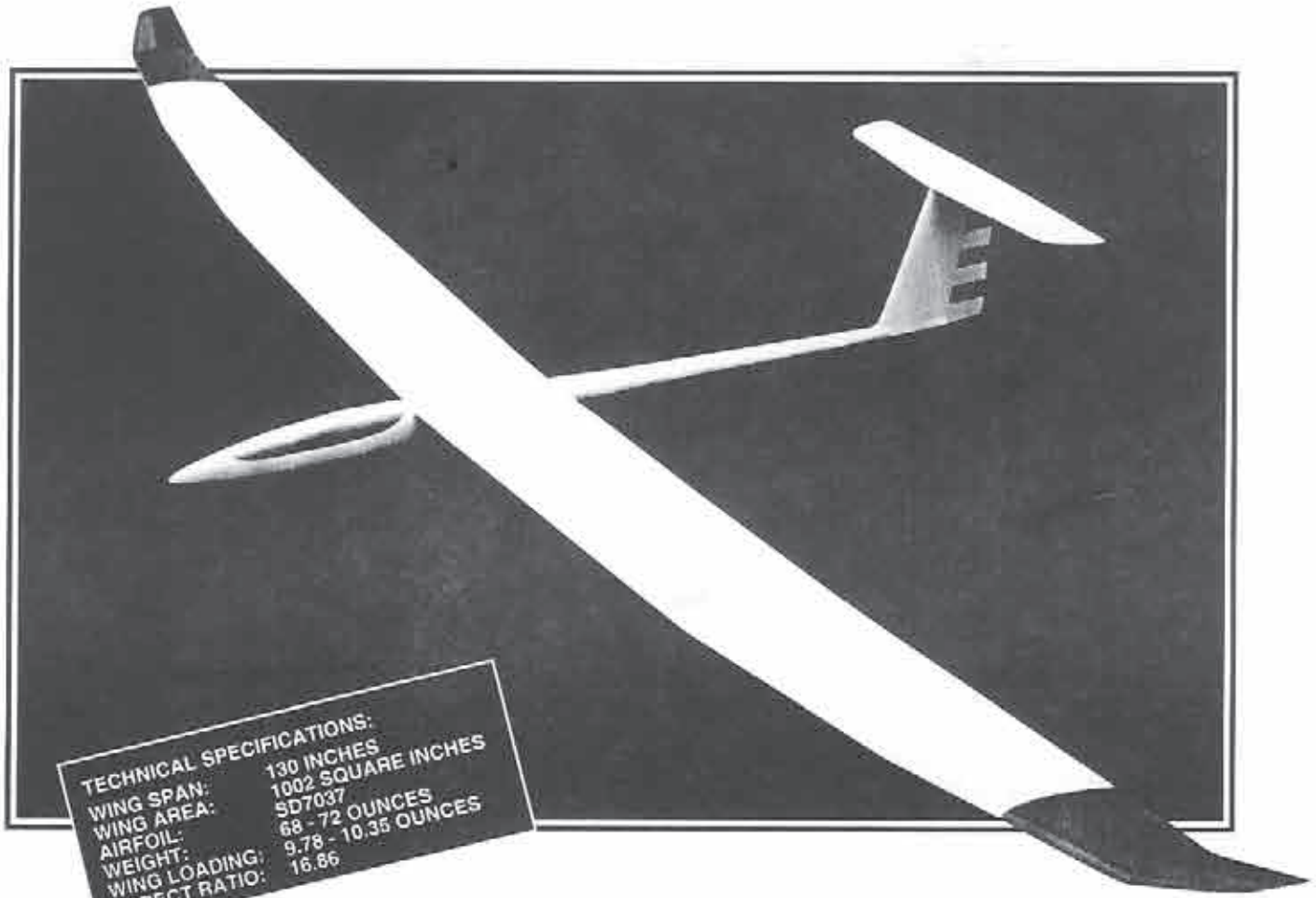


R/C Radio controlled SOARING DIGEST

THE JOURNAL FOR R/C SOARING ENTHUSIASTS

PREDATOR XL

A WORLD CLASS ORIGINAL DESIGNED BY DAVE HILL



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:

- Finished gel-coat fuse. Requires no work except for servo tray and radio gear installation.
- Pre-installed Sullivan Carbon Push Rods.
- Bell Crank and Fin Post factory installed.
- Pre-fitted Canopy with wire hold down installed.
- Stab attachment drilled and tapped.
- Stab Tips and Leading Edge sanded and attached.
- Foam Core Rudder is pre-sheeted and ready to cover.
- Tapped and pre-installed Tow Hook Plate.
- Wing Tips and Leading Edges finished and attached.
- Wings and Stab are pre-routed.

SLEGERS INTERNATIONAL

P.O. Box 364, Long Valley, NJ 07853 U.S.A.
Shipping: 35 Hacklebarney Rd., Long Valley, NJ 07853

(908) 879-9964 - FAX (908) 879-8177
http://www.slegers.com

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

★ VISA ★ MASTERCARD ★ DISCOVER ★

R/C Radio controlled SOARING DIGEST
THE JOURNAL FOR R/C SOARING ENTHUSIASTS

CATCHING A THERMAL

An all glass 1/3 Schueler & Fleckstein ASH 26, way up high!

Photograph courtesy of Robin Lehman.

R/C Soaring Digest (RCSD) is a reader written monthly publication for the R/C sailplane enthusiast and has been published since January, 1994. 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@metazone.com>.

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

***RCSD* Staff**
Jerry Slates - Editor/Technical Editor
Judy Slates - Managing Editor, Subscriptions
Lee Murray - *RCSD* Index/Database (available on-line)
Bill & Bunny Kuhlman - *RCSD* Web Masters

Please address correspondence to:
Jerry & Judy Slates
R/C Soaring Digest
P.O. Box 2108
Wylie, TX 75098-2108 U.S.A.
(972) 442-3910, FAX (972) 442-5258
e-mail: rcsdigest@aol.com
http://www.halcyon.com/bsquared/RCSD.html

Feature Columnists
Bill & Bunny Kuhlman (B^2), Robin Lehman, Lee Murray, Tom Nagel, Mark Nankivil, Dave Register, Dave Sanders, Steve Savoie, Jerry Slates, Gordy Stahl

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

TABLE OF CONTENTS

OTHER GOOD STUFF

Damaged or Improperly Bound Copy?
Please let us know, and we'll replace it. Something always slips by every month!

RCSD ON THE WEB
http://www.halcyon.com/bsquared/RCSD.html

Subscription Information
Highlights & Mailing Status of the Current Issue
RCSD Feature Columnists, Reporters, and Editors
..... E-mail/web addresses, plus general information about their areas of interest.
"Building Along" Construction Aids
..... **1/5 Scale Pilatus B-4** ..... Jerry Slates
..... **1/12 Scale U-2R/TR-1** ..... Coming Soon
Links to Clubs & Organizations
Hot Topics
Event Coverage (Color Photography!)
"In the News" - A compilation of news items of interest to soaring enthusiasts.
On-Line Articles - Great articles originally written for the printed version of *RCSD*.
Bookshelf Listings - A listing of recently published books of interest to aeromodelers.
Complete RCSD Index, 1994-1998

The Soaring Site

Projects in the Mill

There are several RC sailplane projects in the mill, one of which is coming along nicely: the U-2/TR-1. This month, Steve Savoie, finds himself deep in the logistics of constructing a first time mold, so Dave Garwood, Steve's project sidekick, has taken the opportunity to write up the developmental history of the full-size, Lockheed U-2. For those of you building along, we hope you enjoy the in-depth research done by these two talented authors, as they work through the design and development of their own U-2 models.

Another project, the Pilatus B-4, was completed last month. Based on several requests we've received, the next project for "Jer's Workbench" will cover the design and building of a rudder/spoiler/elevator model. Yes, RES, one of the most popular types of sailplane models being discussed, today. Quite by accident, Lee & Bobbie Murray of Wisconsin, advocates of RES (Bobbie shares in Lee's enthusiasm for the hobby), found themselves in the Dallas area this last month. One of the subjects at hand was RES, as Lee brought numerous photographs of design models currently flown at RES events in his area, to share with us, which we plan to share with you in an upcoming *RCSD*, as well.

As always, when sailplane folks get together, there is much to talk about. We certainly enjoyed the company of the Murray's and wish we could attend some of the sailplane events across the U.S. to see first hand what others are building and flying.

Happy Flying!
Judy & Jerry Slates

BOOK REVIEW

"Flugzeugtypen, Band 1, Segelflugzeuge"

by Martin Simons
Stepney, South Australia

For more than ten years Hans - Jürgen Fischer has been publishing excellent three-view drawings and other documentation for sailplanes in the magazine, *Modellflug Internationale*. His work is always first class. The new book contains ten sailplanes of 'classic' or older type, collected together from his previously published material. In approximate order of antiquity, this volume deals with the Rhönbussard, Wolf, Habicht, Weihe, Goevier, Ka 1, Doppelraab, Stösser, Lo 100, and Ka6CR.

In each case there is an excellent three view drawing with wing and fuselage sections and additional detail and colouring information in the form of paintings and coloured photographs. The text is in German but this will not prevent anyone from extracting more than enough for the most sophisticated scale model.

The least familiar of the ten types is probably the Stösser, which was an aerobatic two seat sailplane of 1954, 12.8 metes (42 feet) span with swept forward wings and very lively colour scheme. The Habicht and the Lo 100 were (and still are of course), specialized aerobatic sailplanes. The Goevier was a fine 'side by side' two seater, the Dopelraab a strange trainer in which the instructor sat on a kind of saddle behind the student pilot, and had to reach over the pupil's shoulder to get to the control column.

The amount of detail shown varies a little. In four cases (Wolf, Bussard, Weihe, Habicht), Hans - Jürgen has obviously worked from the full scale workshop plans. The amount of fine detail in these cases is more than most modellers will ever need. I was especially delighted with his Weihe chapter because I am about to start building one myself in quarter scale.

The title of the new, 64 page volume is 'Flugzeugtypen, Band 1, Segelflugzeuge.' The ISBN for ordering is 3-923142-00-5 and the price in Deutsch Marks is 19.80 (postage & packing extra). Write to Modellsport Verlag GmbH, Postfach 21 09 D76491 Baden Baden, Germany, Telefax 07221 952145. I ordered my own copy just before Christmas and it arrived here in Australia in about ten days.

Since this is 'Band 1' it seems definite that there will be more of the same coming, so look out for them. ■

Jer's Workbench

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

Low Tech Design & Construction Rudder, Elevator, Spoiler Model RES - Part 1

Spring time in Texas, for me, means it's time to start a new, spring project. Having reached that conclusion, the hard part is deciding on what the next project should be.

As most of you know, there has been a great deal of discussion on starting a new class of RC flying - introducing new folks to the hobby and competition flying. This new class will eliminate the need for a high priced computer radio plus a 6 servo, all composite glider kit; requiring only a 3 channel radio, a simple glider kit with a wing span of 100" or less, with rudder and elevator control and optional spoilers, is all that's necessary.

I remember back in the 60's, when I started flying RC gliders, these simple kits and 3 channel radios were all that was available to us. It was a lot of fun flying back in those days. I remember making my first LSF spot landing with a rudder, elevator, no spoiler model. For what it's worth, making all my LSF landings for Level I and Level II, flying a simple glider, was a really big thrill. (My LSF # is 222.)

So, remembering the thrill, it was easy to make the decision as to what my next project would be: a simple rudder, elevator, with optional spoilers model. The next step, of course, is to decide on which one!

Since there aren't any models at the local hobby shop meeting my requirements, I plan to design and build one from scratch. Before the cutting and gluing can commence, the first step will be to prepare a set of plans to work from.

So, starting with a 100" wing span, let's first determine what the chord will be, grab a few numbers, and see what happens. Let's say that the wing root is 10", with a tapered tip. The wing would have an 888 square inch wing area, with an aspect ratio (A/R) of 11:1. If the model can be constructed with a gross weight of 49 oz., the wing loading works out to 8 oz. per square foot.

Now, that's pretty good, and I am somewhat satisfied with those numbers, but what if the aspect ratio were increased to say 14:1? Would this be better?

An aspect ratio of 14:1 changes the root chord to 7 inches, with a wing area of 650 square inches. At 8 oz. per square foot of area, the gross weight would come in at 36 oz. I don't think I can build a 100 inch model at this weight restriction, at least not one having much strength to it. The wing would be simply too thin, and probably fold under the pull of a heavy high start; the fuselage would be too light due to lack of reinforcement. Just one bad landing, and all the work would be for naught.

Before the plans can be drawn, several decisions will need to be made. What will be a good airfoil to use? Will the design accommodate a 2 piece plug-in wing, or would a one piece bolt-on wing be better? Do I want an all flying stabilizer or a stabilizer/elevator? How about a V-tail?

Well, I have already decided to build the model low tech. It will not be constructed using Kevlar™ or carbon fiber. Only items that were available in the 60's that can still be obtained over the counter, will be used.

So, I'm off to do some serious thinking, and will share my conclusions next month, as we get this new project underway.

Happy Flying! ■

Suggested Reading for Designing & Building Models

"Model Aircraft Aerodynamics", 1978
Martin Simons
3rd Edition 1995, Nexus Books
England, ISBN 1 85486 121 2

"Understanding Polars Without Math"
B^2 Streamlines
P.O. Box 976
Olalla, WA 98359-0976
e-mail: bsquared@halcyon.com
http://www.halcyon.com/bsquared

■

on the Wing

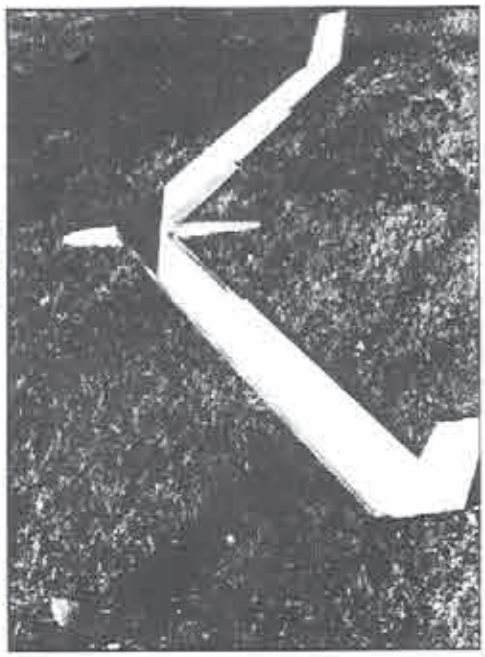
P.O. Box 975
Olalla, Washington
98359-0975
E-mail: bsquared@halcyon.com
http://www.halcyon.com/bsquared/

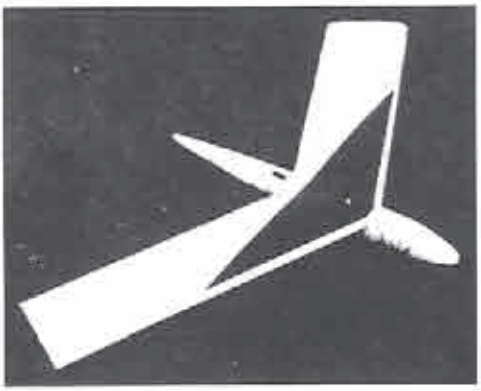
John Dvorak's CO8

John Dvorak, of San Jose, California, was impressed enough with Hans-Jürgen Unverferth's CO8 (May and June 1998 *RCSD*) that he built one! The result of John's efforts is a beautiful swept wing glider which is nothing short of majestic in flight, although it did have its own small difficulties which had to be overcome.

Construction is of foam, carbon fiber, and fiberglass. George Sparr, of Aerospace Composite Products, served as consultant for the fabric layup and internal structure. The uni-directional carbon fiber is laid out parallel to the wing, with the outer 'glass oriented at 45 degrees. The spar is a half inch carbon fiber tube; the wing rod is also carbon.

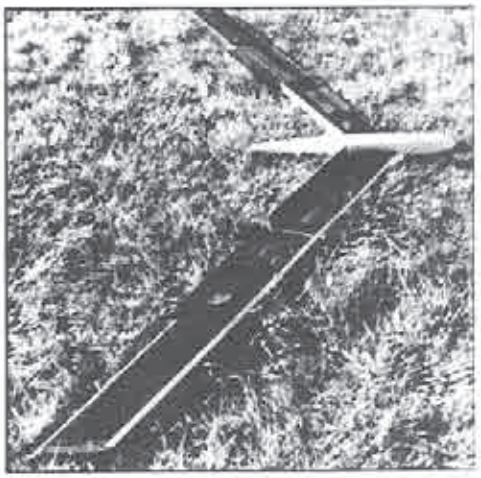
As can be seen in the picture, the wing breaks down into three main pieces: a center section and two outer wing panels.





Usual practice is to make the joint parallel to the air flow, but John cut the wing at 90 degrees to the leading edge. This has worked well, with no problems in evidence.

We received an e-mail from John in which he commented about excessive pitch up when the flaps were lowered. Excessive elevator compensation was required, and this reduced control. A quick cyber-trip to Andy MacDonald's page <http://www.cscs.com.au/~andy/> provided some information about CO8 flap deflection directly from Hans-Jürgen Unverferth. Hans-Jürgen's CO8 flies with four degrees



of positive deflection for launch and thermalling, eight degrees for landing.

Eight degrees did not slow the aircraft sufficiently for John's flying style, and his initial solution was to change the hinge line of the flaps so they would serve as air brakes. This modification did not last long, as it disallowed using the flaps for efficient thermalling. The 'ship is now flying with the original flap installation back in place, and 90 degrees of flap deflection. The necessary pitch trim change is just about what was needed when the flaps were deflected eight degrees. To maintain control authority, the servo arms have been lengthened, providing more elevator travel.

A bridle is used for launching. The two tow hooks are screwed into half inch dowels mounted at the wing separation line. Only one launch mishap so far — a roll on launch due to having the nose pointed up. A straight ahead throw with the line tight, followed by up elevator, gives very high winch launches. While John hasn't had much thermal flying experience with his CO8, he's promised to let us know how it performs.

If you have a tailless project which you feel may be of interest to *RCSD* readers, please let us know. We're always on the lookout for material for future columns. Contact us at P.O. Box 975, Olalla, WA 98359-0975, or at <bsquared@halcyon.com>.

■

Health Concerns from the Sun

By Bill Kuhl
Winona, Michigan

A Few Words of Precaution

Thermal seeking sailplane pilots are a group of sun worshipers much like the people that bake themselves in backyards and beaches for the ultimate tan. But our reasons for a fondness to the sun's most intense rays are somewhat different; it is the major ingredient for the perfect thermal lift.

In the last few years, doctors have discovered how harmful the sun is to our skin and eyes. Luckily, there are precautions we can take to diminish the harmful effects of the sun. The discussion that follows focuses on the harm done to our skin, eyes, and overheating our body.

The Eyes

Without the proper protection for your eyes during the day's most intense sunlight, your eyes can be sunburned. The medical term for this is "photokeratitus", which means the eye's outer-most layer of cells is damaged. In such a condition, the eyes will be raw and prickly to light. Normally the condition heals within 24 to 48 hours, but it can be very painful.

Three types of UV radiation are: UVA, UVB, and UVC, the difference between them being their varying wavelengths. UVA rays can penetrate deep into the inner eyes. UVB rays can burn the first layer of eye tissue. UVC rays are blocked in the ozone layer in the Earth's upper atmosphere; consequently, these rays are not a problem.

Long Term Effects

With continued UV exposure over time, cataracts are more likely to form; a cataract is a cloudy yellowness of the eye's lens. Cataracts are formed by a chemical reaction between UV radiation and the eye's lens.

Retinas

Although the research is not completely conclusive, there is evidence that prolonged exposure to UV radiation can lead to macular degeneration of the retina. Seen in elderly people, this disease is untreatable. The most vital area of the retina, the macula becomes damaged causing a loss of central vision.

Protection

On any day that there is enough sun for sunburn, sunglasses are a must. Hats with a wide brim or baseball caps can help also. Selecting sunglasses that will do a sufficient job should be easier now that there is a standard labeling program for rating non prescription sunglasses. The Sunglass Association of America (SAA) in cooperation with the Food and Drug Administration (FDA) developed this labeling program based on the UV categories specified by the American National Standards Institute.

Sunglasses are grouped into three basic types:

- Cosmetic sunglasses, the least protective type, are recommended for non-harsh sunlight activities out of the direct sun. Block less than 60 percent of visible light, block at least 70 percent of UV-B radiation, and at least 20 percent of UV-A radiation.
- General-purpose sunglasses are adequate for most uses for most people. These glasses block from 60 to 92 percent of visible light, block at least 95 percent of UV-B radiation, and at least 60 percent of UV-A radiation.
- Special-purpose sunglasses can be very dark or rather light, and are for special purposes. Dark shades may block up to 97 percent of visible light, light shades down to 20 percent of visible light. These sunglasses block at least 99 percent of UV-B and 60 percent of UV-A.

Additional Notes

Lens color and the tint darkness are unrelated to ability to block UV radiation. Be aware that some colors of lenses will make it difficult to see things in a natural way. For example, amber glasses can make it difficult differentiating red from green. Also, the sunglasses must fit properly and keep the sun out from all sides.

Skin

Our body's largest organ, the skin, can suffer many ill effects from exposure to the sun. One type of skin cancer, malignant melanoma, can be fatal. Other skin cancers can have severe consequences, as well. Exposure to the sun causes pre-mature aging of the skin. There has also been evidence that exposure to the sun can weaken the immune system. The sunburn that most of us have experienced at one time, besides being painful, can contribute to skin cancer later in life.

You say, "I get a gradual tan which will protect me." True, your skin might not sunburn as easily with a tan, but that does not mean the sun is not doing damage to the skin. Sun Protective Factor (SPF) of a tan might be SPF of 4 at best; the Skin Cancer Foundation recommends sunscreen of SPF 15 or more.

Who Is Most at Risk

Some people have to take even more precautions when in the sun. There is a system of six skin types; type 1 is at the most risk and will sunburn very easily. Type 6 is the darkest skin, and will not sunburn so easily, but is still at risk from effects of the sun. People with type 1 or 2 skin would have fair skin, blue or brown eyes, and most likely blonde or red hair. The system is only a guide, and does not classify people perfectly.

How to Protect Your Skin

Protecting your skin from the harmful effects of the sun is done by either covering the skin with clothing, which most likely is not an option if it is very warm, or applying sunscreen. Not to be confused with suntan lotions, sunscreens are applied to the skin to either reflect or absorb the sun's rays.

The effectiveness of a sunscreen lotion in protecting your skin from sunburn, is rated by using a SPF number (Sun Protective Factor). Protective qualities increase with the number; the Skin Cancer Foundation recommends SPF 15 or greater. Note that SPF rating only refers to UV-B rays; UV-A is rated according to the percentage UV-A that is blocked.

Heat Exhaustion - Heat Stroke

How Heat Affects the Body

As your body begins to heat up, the "hypothalamus", the body's thermostat, determines if the body is too warm. Blood vessels expand and the heart beats faster and fuller, increasing the blood flow. The blood flow carries heat from deep inside the body to the skin's surface. Evaporating of sweat on the skin carries away a large amount of heat, cooling the body. High humidity conditions interfere with the process. If fluids lost during sweating are not replaced, the body becomes dehydrated and heat exhaustion can result.

What fluids to drink when your body is very warm seems to be something that many people disagree on. What is bad is anything too cold, alcohol, or sugary drinks.

Some people think that the so called "sport drinks" are worth the money because they replace electrolytes; other people think it is a marketing gimmick. Many people say drink water with some salt.

Even more serious than heat exhaustion is heat stroke, which is a medical emergency that can be fatal. A person suffering from heat exhaustion may have dry skin and no sweating. Their body temperature can reach 104 degrees or higher, followed by weakness, dizziness, rapid breathing, and sometimes unconsciousness.

■

TECH TOPICS

Dave Register
Bartlesville, Oklahoma
RegDave@aol.com

Elliptical Planforms

Over the past several months, we've talked about stability factors and general design considerations for RC soaring. Then, we reviewed techniques and equipment for cutting foam cores for your super ship. (Please see an important safety sidebar on power supplies from Al Scidmore). Now, let's look at some refinements to those design considerations that may affect your choice of wing layout. For the next couple of columns, we're going to talk about wing planforms.

The planform is the general, two-dimensional outline of a wing, without consideration of a specific airfoil. Aspect ratio, spans and chords make up the general information we try and capture in a planform design.

Over the years, modelers and full-scale craftsmen have tried out all sorts of combinations. Among the most elegant are the gull wing configuration of the Minimoa (full scale) and its replication in the Bird Of Time (RC). Among the most efficient are the elliptical outlines of the Supermarine Spitfire and the high aspect ratio designs of the ASW series of full-size sailplanes.

In modeling circles of late, the triple and quad taper composite ships are proving to be extremely efficient and enjoyable to fly. But without access to complicated computer optimization codes, how will a respectable builder figure out how to lay out one of these ships? Well, let's just tackle that little problem here.

Schuemann Planform

First of all, required reading for the course is Wil Schuemann's article on modifications to his ASW 21 published in the February, 1983 issue of *Soaring* Magazine. Don't know where to find it? Chris Adams of Scrollsander fame has scanned this article and made it available for viewing on his website: <http://www.scrollsander.com>.

Although the hard math is missing from this article, the basic conclusion is that a straight trailing edge with appropriately tapered leading edge is the preferred planform configuration. This layout minimizes span wise flow on the wing, which in turn minimizes tip vortices. This allows the induced drag to approach its theoretical value:

$$Cdi = C_L * C_L / (Pi * e * AR)$$

Where Cdi is the induced drag, C_L is the lift coefficient, e is the planform efficiency factor (>1), AR is the aspect ratio and Pi =3.14159...

Although not strictly correct on the basis of the February article, these days, we typically refer to a straight trailing edge, tapered leading edge wing as a Schuemann planform.

Elliptical Distribution

Where additional planform considerations come into play is with the planform efficiency term (e). Although I have never seen the proof derived in mathematical form, any aerodynamicist will swear that an elliptical lift distribution along the wing span will minimize 'e' and thus give the lowest induced drag. I'll accept that as gospel and move on.

In the absence of Reynolds number effects, tip vortex problems, wash out and airfoil changes, an elliptical lift distribution will be given by an elliptical outline to the wing. There's a LOT more theory that can be brought to this problem and I encourage those who want to explore this in more detail to take a look at two excellent web sites. The first is an Australian site at the University of Sydney that reviews a number of concepts associated with theoretical aerodynamics, while the second is a NASA sponsored site with a great deal of information for teachers in this discipline.

http://aeroserver.aero.usyd.edu.au/aero/contents.html

http://www.allstar.fiu.edu/

These cover the theory much better than I ever can. In the meantime, I'll stick with the geometry arguments.

Schuemann-Ellipse Planform (SE)

It seems natural to combine the advantages of the Schuemann lay out with the efficiency of the elliptical lift distribution. We'll refer to this as a Schuemann-Ellipse planform (SE).

Now, from Schuemann's work, we know that his suggested layout is an efficient way to minimize tip vortices. We'll assume that we won't use washout or change the airfoil along the span. Thus, the primary correction we need to apply to the elliptical geometry distribution for modeling applications is Reynolds number.

Let's look at this for just a minute to get a feel for the problem. For an open class ship, a typical root chord may be ~9.5 inches. A typical tip chord will be ~3 inches. Near minimum sink, a ship like this is moving at ~18 ft./sec. Thus, the Reynolds number range across the span (straight and level flight!) will be from 90,000 to 30,000.

Some of this range is covered in the UIUC database. For a few airfoils, the old NACA data will suffice. And finally, we can check a little of this from the small wind tunnel in the basement. With this correction in hand (discussed in more detail next month) we can take our Schuemann-Ellipse planform and progressively correct the chord for the decrease in Reynolds number and obtain an optimized layout.

What do we do with that layout? Well, with that distribution defined, you can now choose the number of taper breaks you think you can handle and then fit them to the continuous SE planform. This should give you the best overall lift distribution with a reasonable number of taper breaks. That fitting can be done quite easily in an Excel spreadsheet, which will be discussed next month.

Let's save the ugly details for May and cut to the chase for now. Figure 1 contains the

Figure1: S-E Planform with Re Correction

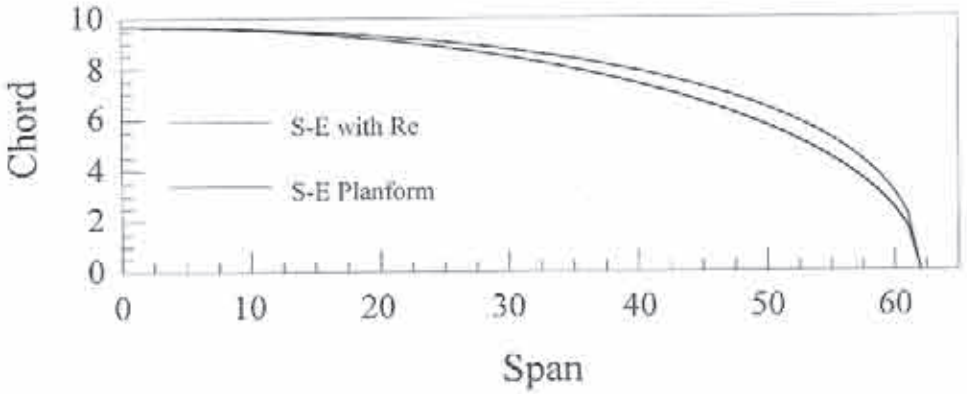
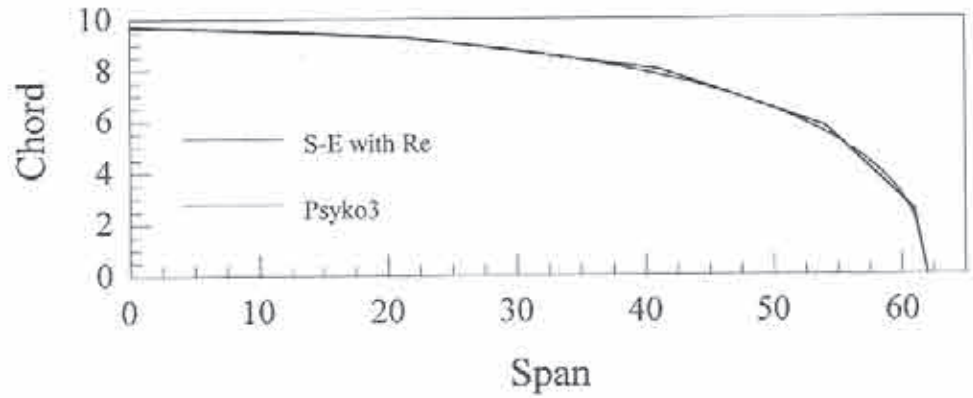


Figure2: Psyko3 vs S-E Corrected Planform

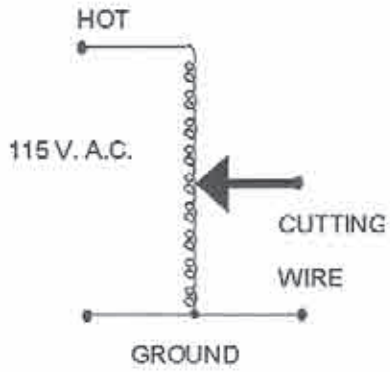


Foam Cutting Power Supply Safety

Al Scidmore wrote concerning safety features of foam cutting power supplies. As noted in *RCSD*, the original *Model Aviation* article and in other forums, the use of a ground fault interruption circuit and a step-down isolation transformer (110VAV to 24VAC) are REQUIRED to do this job safely. When properly isolated, a light dimmer is an inexpensive variable voltage source, but finding a surplus Variac is definitely the right way to go. Al says it best:

"I've followed with interest the discussion in *RCSD* on foam cutting. As I read closely some follow-up suggestions in other forums, I see great danger in the use of a simple variac (alone) to provide the power for the bow cutting wire. If a simple mistake is made, a deadly situation can result.

"I have enclosed a schematic of a Variac. You will note that there is a direct connection of the ground wire through to the cutting wire. The slider on the transformer core adjusts the output voltage as it moves up and down. One can purchase a simple variac for a reasonable amount, wire it up, put a



plug on the input side, and plug it into the 115v house power wiring. This is all fine unless a two wire plug with no ground is used and it is plugged in upside down. Worse yet, it may be wired wrong by the owner.

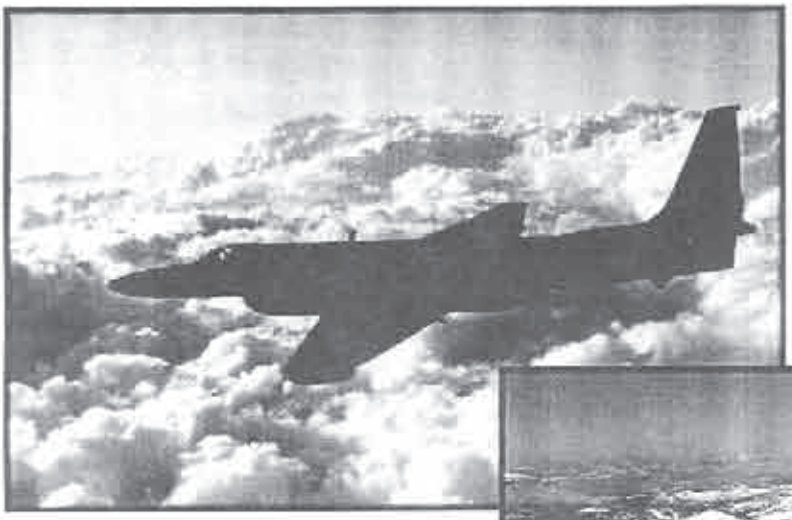
"Wrongly wired or plugged in, one of the leads carries the full 115V power line voltage. Touch (a) the cutting wire, and (b) a ground like a water pipe, a faucet, or the damp basement floor, and the circuit can be completed through your body. The outcome could be a good shock at minimum and electrocution at the worst. I strongly recommend the use of an isolation transformer on either input or output end of the Variac.

"The first case requires a 115V AC isolation transformer, which can be quite expensive. As Ken Barker suggests, the later case is more cheaply accomplished by using an inexpensive surplus transformer. My low voltage, cutting power supply uses two transformers wired parallel on their inputs and serially on the output to give me about 24V peak AC. This gives me sufficient voltage (at 3 to 4 amps.) for a hot 60 inch cut-off bow of 20 mil stainless wire. For my 30 inch airfoil cutting bow, the variac is turned down for that perfect cutting speed (about 2 amps). There are quite a few outlets for surplus transformers. I have used candhsales.com, myself. My wire is deep-water stainless steel fishing wire, which comes in reasonable sized packages.

"I wish to caution against the use of a light dimmer, as well. The problem of shock or electrocution remains. In addition, simple dimmers are designed for resistive loads only. These dimmers contain silicon semiconductor devices that can be damaged by operating with inductive (like transformers) or capacitive loads. Device failure can lead to zero or full (115V) voltage being applied to your cutting bow." ■

SE planforms with and without Reynolds number corrections. As you can see, the corrections increase as you proceed to the wing tip. Figure 2 displays the Reynolds number corrected SE planform for a wing with the same span and aspect ratio as a Psyko3. Figure 2 also displays the actual chords and taper breaks for that wing.

The Psyko3 is one of the sweetest handling, gawdamighty cruising ships I've ever flown. It also exhibits excellent tip stability with almost no tendency to tip stall under any conditions. Looks like we got it pretty close, huh? Next time, let's do the details and provide a spreadsheet so you can try it yourself for your own designs. ■



TR-1.
USAF photos.

U-2/TR-1 Specifications

	U-2	TR-1
Wing span:	80 feet	103 feet
Length:	49 feet, 7 inches	62 feet, 11 inches
Empty weight:	13,000 pounds	15,100 pounds
Maximum weight:	23,100 pounds	41,000 pounds
Maximum speed:	528 MPH	430 MPH
Service ceiling:	80,000 feet	90,000 feet
Range:	4,000 miles	6,250 miles

A TR-1 lands after a mission in the Persian Gulf theater of operations. Notice the monster flaps. USAF photo.

Lockheed U-2 Spyplane

Brief History and Development

by Dave Garwood
Scotia, New York

Designed to keep an eye on America's Cold War adversaries, the Lockheed U-2 first flew in 1955. It was a successful design and even throughout the age of spy satellites it continued to provide such useful imagery that twelve U-2s flew in the Gulf War of 1991, and the plane flies today for NASA and the USAF. Not many airplanes have remained in service for 45 years, and not many jets look as much like a sailplane as the U-2. Even fewer have a L/D ratio of 27:1.

Regular readers know that Steve Savoie and I are working on building a molded fuselage U-2 glider. For me, interest in a scale modeling subject often begins by learning about the capabilities of the prototype aircraft, and the more I find out about the full scale bird, the more excited I get about modeling it. The history of the U-2 is replete with remarkable stories of aircraft design and reconnaissance operations, and since the U-2 wing has a longer aspect-ratio than many early gliders, we figured it would make a reasonable scale sailplane subject.

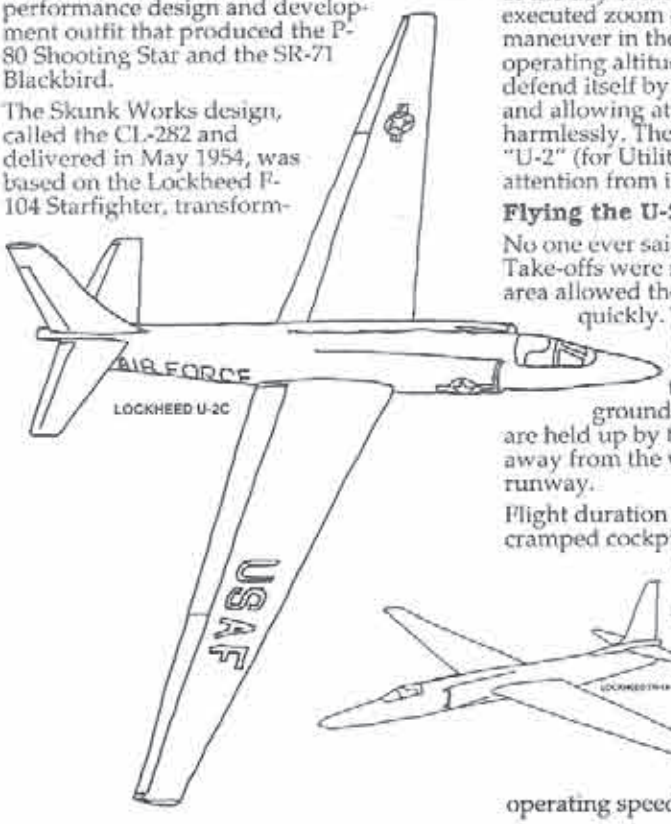
This article concentrates on the development and early U-2, which evolved into the TR-1 (Tactical Reconnaissance) a larger and even more capable version. The two planes are sometimes confused, and the older U-2 designation is often used to mean both the U-2 and the TR-1. It is the TR-1 which Steve and I are modeling.

U-2 Design and Development

Wary of Soviet atom-bomb development, in March 1953 the US Defense Department issued a design requirement for a subsonic jet aircraft which could carry a 700-pound payload 3000 miles and operate at altitudes up to 70,000 feet. The mission was daylight photo reconnaissance from extreme altitudes, and the plane was to be capable of overflying the Soviet Union.

Heading the Lockheed design team was the legendary Clarence "Kelly" Johnson, who had exceeded expectations with his work on the Lockheed Electra, and the P-38 Lightning. Johnson founded the famous Lockheed Skunk Works, the secret, high-performance design and development outfit that produced the P-80 Shooting Star and the SR-71 Blackbird.

The Skunk Works design, called the CL-282 and delivered in May 1954, was based on the Lockheed F-104 Starfighter, transforming the shortest-wing jet of the 1950s into the longest. With a span of 80 feet and a length of 50 feet, many remarked that it looked like a sailplane.



Lockheed bid $22 million for 20 airplanes with spare parts. The cost of the highly classified spyplane project was hidden in the budgets of the CIA and the USAF, and the cover story if needed was that it was a high-altitude research plane for the National Advisory Committee for Aeronautics (NACA) the progenitor to The National Aeronautics and Space Administration (NASA). NACA never flew the plane although it carried NACA markings as a subterfuge. NASA flies the TR-1 today.

The prototype "Article 341" first flew on July 29, 1955, and flight testing indicated it was a stable photography platform and it delivered the payload capacity and range that was expected. It carried no weapons. Attacking fighters and fin-guided missiles of the day could reach 70,000 feet in a well-executed zoom climb, but they could not maneuver in the thin air at the U-2s operating altitude and the U-2 could defend itself by simply changing course and allowing attacking ordnance to pass by harmlessly. The spyplane was designated "U-2" (for Utility) by the USAF, to divert attention from its true mission.

Flying the U-2

No one ever said the U-2 was easy to fly. Take-offs were no sweat as the large wing area allowed the plane to lift off easily and quickly. The two landing gears located along the fuselage centerline allow the plane to drop a wing tip to the ground when at rest, so the wings are held up by two "pogos" which fall away from the wing on departure from the runway.

Flight duration was up to 12 hours in a cramped cockpit, and navigation was by pre-GPS instrumentation. Visibility was limited, and the pilot's view of the ground was through an optical sighting device looking through the bottom of the aircraft. One problem for the pilot was the tight range of the operating speed between high speed buffet

Foreground is TR-1, background is U-2C. NASA photo.

and stall buffet in the thin air at cruise altitude. As increasing sensory equipment payloads added weight to the plane, this speed range narrowed to 10-12 knots, and was known to pilots as "coffin corner."

Landing the plane was tricky. In ground effect it would really glide, and the pilot could not see the ground beneath him. Generally another U-2 pilot in a chase car would follow down the runway, calling the ground clearance over a radio so the pilot would know when to flair. When the aircraft rolled to a stop, it would fall off onto one wing tip, which were fitted with replaceable, wearable tip guards. The pogos were re-inserted for taxiing. Pilots must be highly skilled and highly trained to successfully fly the Dragon Lady.

In addition to down-looking and side-looking photography, the U-2 has been used to gather radioactive fallout particles high in the atmosphere, another sign of atomic bomb development, to gather radio emissions for "signal intelligence" (SIGINT), to search for people lost at sea, to drop packages via parachute to be recovered by other aircraft - simulating recovery of a returning satellite, and natural disaster recovery mapping. A tailhook-equipped version qualified the U-2 for aircraft carrier operations, and made 30 landings and take-offs from the USS America.

Cold War Incident

Perhaps the most famous U-2 incident was the Russian shoot-down of the U-2 flown by Francis Gary Powers while flying over central Russia.

President Ike Eisenhower had proposed an "Open Skies" policy, that airspace over any nation should be open to all. The Russians did not agree, and when U-2 flights over Russian territory began, they were about as angry at the US as they have ever been, before or since.

In July 1956 a U-2 took off from Weisbaden, Germany and flew over Moscow and Leningrad, extremely well-defended areas. Soviet air defenses were taken by surprise. They tracked the flights on radar but could not stop them with the interceptors and missiles then available, due to the problem of maneuvering in the thin air at 70,000 feet. Kelly Johnson's plan for the defense of the reconnaissance plane was working, and the U-2 returned safely to base with phenomenally clear photographs. Flights over Russia continued, departing from England, Germany Turkey, and Japan. The Soviets complained bitterly, but secretly, for they did not want the world to know their air defenses were useless in this situation. The US did not respond to the complaints.

On May 1, 1960 "civilian" CIA pilot Frank Powers took off from Inslerk, Turkey to photograph ICBM sites at Plesetsk and Sverlosk, intending to land in Bodo, Norway. This was his 28th U-2 flight, but the very first to traverse Russia.

Even though it was May Day, the Russians were prepared and mounted an all-costs effort to knock the plane out of the sky, launching 14 SA-2 missiles and scrambling MiG-19 fighters. The coordinated explosions of 14 missiles blew the tailplane off the fragile airplane and it entered an inverted spin. Centrifugal force prevented Powers from activating the airplane-destruct system.

The U-2 was not fitted with an ejection seat because a pilot was not thought to be able to survive an ejection at operating altitude. Powers was able to exit the spinning plane at low altitude and parachute safely. The Russians shot down one of their own MiG-19s in the operation.

Powers was tried in Russia as a spy, giving the Soviet Union an incredible propaganda victory. Imprisoned for a year and a half, Powers was exchanged for captured KGB agent Rudolf Abel, and returned to the US to work for Lockheed as a test pilot. His life ended in a traffic-reporting helicopter crash in Los Angeles.

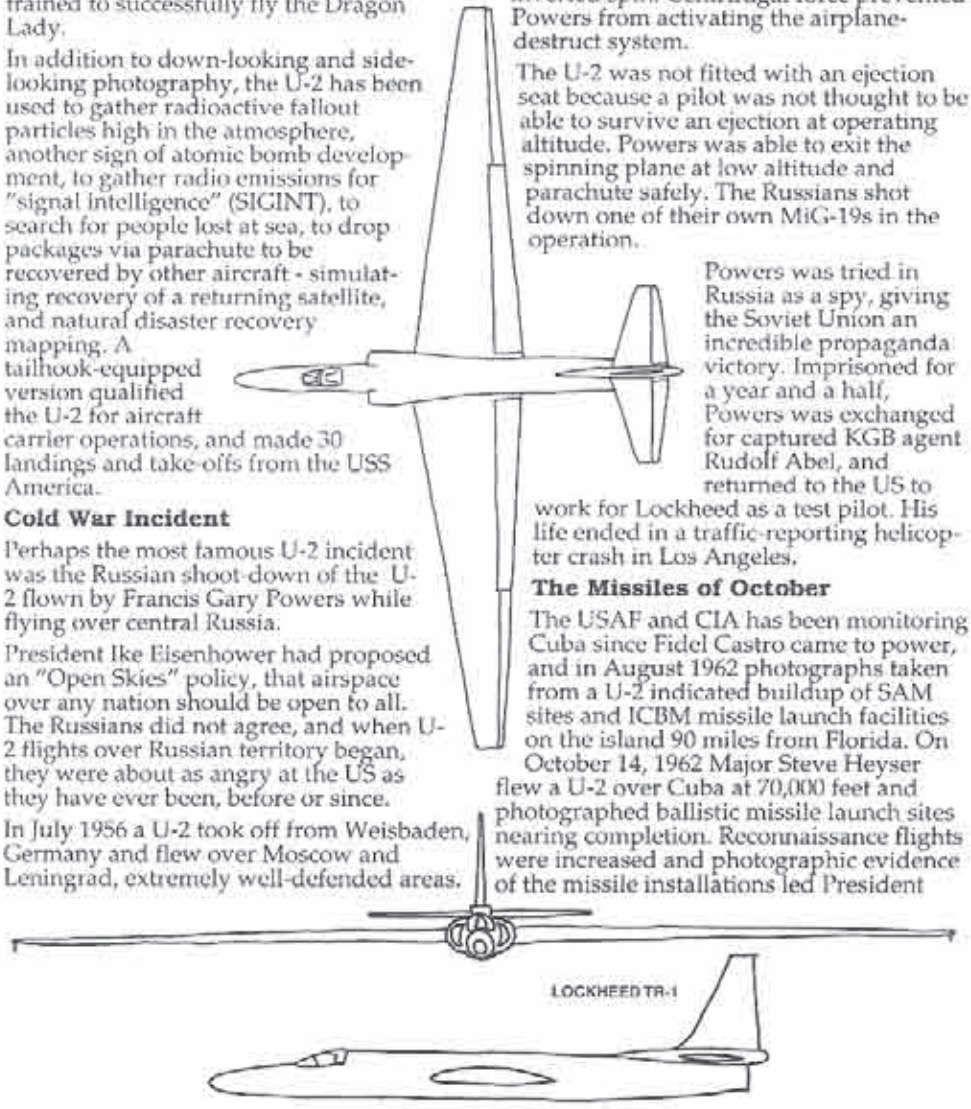
The Missiles of October

The USAF and CIA has been monitoring Cuba since Fidel Castro came to power, and in August 1962 photographs taken from a U-2 indicated buildup of SAM sites and ICBM missile launch facilities on the island 90 miles from Florida. On October 14, 1962 Major Steve Heyser flew a U-2 over Cuba at 70,000 feet and photographed ballistic missile launch sites nearing completion. Reconnaissance flights were increased and photographic evidence of the missile installations led President John F. Kennedy to order an blockade of Cuba to halt the delivery of Russian missiles and put economic pressure on Cuba.

Kennedy triggered an eyeball-to-eyeball showdown with Nikita Kruschev by declaring, "An attack on any country in the Western Hemisphere launched from Cuba will be considered an attack by Russia on the United States." He said to the men of the U-2 squadrons, "You gentlemen take excellent pictures."

The Cubans didn't like the overflights any more than the Russians had in the 1950s, and by now ground-to-air missiles had improved. Major Rudolf Anderson, flying from Laughlin AFB, Texas was shot down and killed by an SA-2 surface-to-air missile. Two other U-2s were lost during Cuban Missile Crisis operations, to unknown causes.

In the end, the Naval embargo succeeded, and the ICBMs were withdrawn from Cuba. Some reckon this is as close as we came to World War III during the Cold War period.



U-2 Nomenclature

- CL-282 - early design, a stretched wing Lockheed F-104 Starfighter.
- Article 341 - the CIA secret project development name for the aircraft.
- U-2A - first production version, with engine upgrade from the prototype.
- WU-2 - "weather" version for high altitude atmospheric particle sampling.
- U-2CT - two-seat version for flight training.
- U-2R/TR-1 - A much larger version of the U-2 (R for "revised"), really a new aircraft, now with a length of 63 feet and a span of 103 feet. The designation was changed to "TR" for tactical reconnaissance to more accurately reflect its mission, which by now was no longer a secret.
- ER-2 - Earth Resources, civilianized version flown presently by NASA.

U-2/TR-1 Paint Schemes

- Early versions were natural aluminum color with USAF markings.
- Most commonly seen was the overall flat-black scheme with either USAF markings or a simple red tail number for CIA versions.
- There is a beautiful two-color gray camouflage "sabre" scheme.
- The High Altitude Sampling Program version was light gray overall.
- The USAF Flight Test Center version is overall white with a red longitudinal fuselage stripe.
- The NASA civilian versions are generally white with a light blue stripe, and two-place training versions are overall glossy white with USAF markings.
- And finally, the cover of David Donald's *Spyplane* shows green-on-green camouflage scheme with USAF markings, presumably a Viet Nam era scheme.

The Future of the U-2

A plane that's been in service for 45 years generates plenty of hairy flying stories, like straying into Russian airspace when flying at night from Alaska, like running out of fuel over Viet Nam because landing sites and alternate landing sites were closed because of weather. The U-2 flew over areas disputed between Israelis and Egyptians in 1973, giving photographs to both sides to keep the peace in a buffer zone. Twelve TR-1s were deployed to the 1991 Gulf War. This amazing airplane can still provide tactical intelligence information not available from satellites, RPVs and other means.

It looks like the U-2/TR-1 will continue in service into the next century, because Steve Savoie's company, Vermont Composites, is making parts for them. Which parts they are making and the quantity ordered is classified.

References:

Lockheed U-2 by Jay Miller. (c) 1983 Aerofax, Inc., Austin, Texas, ISBN 0-942548-04-3

Lockheed U-2R/TR-1 by Jay Miller and Chris Pocock. (c) 1988 Aerofax, Inc., Arlington, Texas, ISBN 0-942548-43-0

Modern Spyplanes by Doug Richardson. (c) 1990 Salamander Books, Ltd., London, England, ISBN 0-13-589854-4

Spyplane - The Secret World of Aerial Intelligence Gathering by David Donald (c) 1987 Aerospace Publishing Ltd., London, England, ISBN 0-87938-258-9

U-2 Spyplane in Action by Larry Davis. (c) 1988 Squadron/Signal Publications, Carrollton, Texas, ISBN 0-89747-202-0

NASA web site <www.dfrc.nasa.gov>. You can even hire the NASA version ER-2 for your own private aerial reconnaissance tasks. The photographs NASA has taken are in the public domain.

USAF web site <www.af.mil>. Still an asset in the USAF inventory, this web site has photographs of the TR-1 and many other USAF airplanes. ■

ELECTRIC CONNECTION

by Mark Nankivil
7411 Canterbury Ave.
St. Louis, Missouri 63143
(314) 781-9175
nankmc@ibm.net

Electric Powered Models
A Beginner's Primer - Part II

I hope you've done your homework of researching the information sources outlined in my last column. A little knowledge goes a long ways towards helping one gain useful experience. That is, unless crashes or non-starts are what you want to experience!

For those of you interested in a couple of useful software programs that will help you look at electric motor/batteries/airframes we'll take a look at ElectriCalc 2 and MotoCalc 5.01.

ElectriCalc 2 is an electric flight prediction software program that is very simple to use and, from my experience, quite accurate. ElectriCalc 2 has large databases covering a broad selection of available electric motors, available batteries (actually cells) - all the Sanyo cells on the market today, and propellers from different manufacturers. In addition, there is very good database of existing electric model types (177 entries) that you can use as examples to compare your proposed model with. Beside the existing databases, you can insert your own parameters. Say you're planning on scratch building a Speed 400 powered model of the F-82 Twin Mustang? Then take a look at the database and compare your ideas for a model against Jim Ryan's P-38 Lightning, the Hobby Lobby/JanR P-38, DH Mosquito, PBY Catalina or B-25 Mitchell, or other models like the Hirobo DH Comet or Graupner Partenavia. It's a great way to establish a successful layout and dramatically improve your chances for a good flying model, too.

The onscreen layout for ElectriCalc 2 has 4 panels that, from left to right, cover Power, Motor, Drive and Flight parameters.

POWER covers the number and type of cells used to make up the battery pack to power your model plus you can adjust the throttle setting.

MOTOR covers the type of electric motor your using.

DRIVE covers the prop size and manufacturer, as well as whether it is a 2, 3 or 4 blade propeller, and if it is a direct drive or geared set up.

FLIGHT parameters covers the size, weight and estimated drag coefficient of the model plus whether it is single or multi motored. For multi motored models, you can choose whether the motors are wired in series or parallel.

When you fill in the blanks for these four parameters, you will see across the bottom of the panels the results for:

POWER	MOTOR	DRIVE	FLIGHT
Battery Amps	Motor RPM	Prop RPM	Climb Rate
System Efficiency	Motor Efficiency	Prop Watts	Climb Angle
Watts Created	Watts Lost	Watts/ lb.	Max. Climb Rate
Watts Lost	Motor Watts	Gearbox Watts	Max. Height Gain
Batt. Pack Weight	Motor Volts	Pitch Speed	Stall Speed
Max. Efficiency	Motor Constant	Thrust in Oz.	Max. Speed
	Max. Efficiency	Drag in Oz.	Cruise Time

Gee, what else do you need to know! You can print out the results easily and compare the numbers to other combinations you're looking at by using the graph functions. The Analyzer function will allow you to look at a range of cell counts, prop sizes and a range of amperages. In addition, ElectriCalc 2 has the ability to allow a direct comparison of up to five models side by side. Yet another way to analyze the possibilities!

As an example of what ElectriCalc 2 can do to help you zero in on a good layout, I was originally planning on powering my O/D 76" span Douglas C-54 Skymaster with 4 - geared Speed 400 motors. When I looked at the initial set up I had in mind and compared it with other possible motor set ups, I found that it would be more effective to go to direct drive set up using Speed 500 size motors. This set up would also be less expensive too, enough so that the program paid for itself. Not bad! All in all, ElectriCalc 2 is a very useful program and is well worth having on your PC.

MotoCalc 5.01 is another electric flight prediction software program that accomplishes much of what ElectriCalc 2 does, but in a slightly different format. It has the additional advantage of handling electric ducted fan units and factors in the electronic speed controller as part of the flight package.

MotoCalc 5.01 has 6 on-screen panels that you work with. These sections are:

MOTOR - Covers the characteristics of the motor including its weight. There's a substantial database of motors to choose from or you can enter the motor characteristics yourself.

BATTERY - Covers all of the available Sanyo and SR batteries.

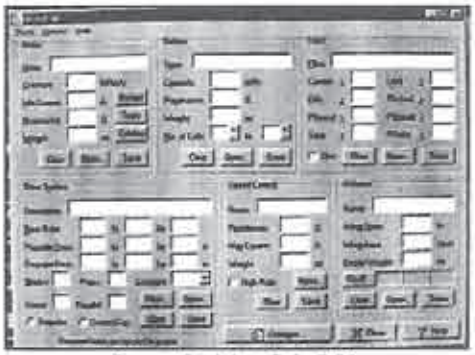
FILTER - With this, you can provide limits on such categories as current, thrust, efficiency, etc. A good way to narrow your results down to realistic numbers.

DRIVE SYSTEM - Describes whether it's a direct drive or geared, propeller manufacturer, propeller diameter and pitch and blade count. This is where one would also select single or multi-motor and whether they are wired in parallel or series. Ducted fans are also a selection in this section.

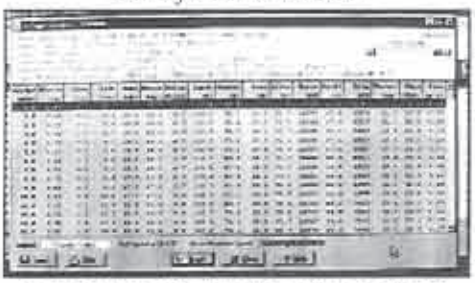
SPEED CONTROL - Select the speed controller you'll be using or load the characteristics if it is not in the supplied database.

AIRFRAME - Select from the limited database or load your own. The weight entered in this section is the empty airframe weight. The program adds in the motor, cell and speed controller weights to make up the all up weight of the model.

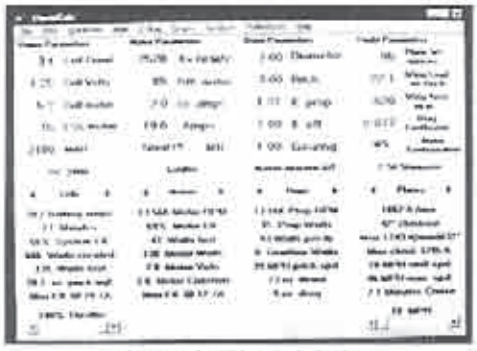
The results from MotoCalc 5.01 will help you narrow down the myriad of possible combinations of "pieces" that make up a successful model. The analysis chart and



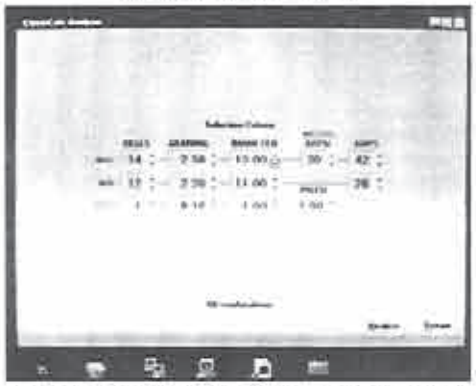
Screen for MotoCalc 5.01.



In-Flight Analysis Screen for MotoCalc 5.01.



Screen for ElectriCalc 2.



ElectriCalc 2 Analyzer Screen. In this example, we're looking at combinations involving 12 to 14 cells, propellers from 11 to 13 inches in diameter, prop pitches at 1" increments, 28 to 42 amps range. These parameters add up to 60 possible combinations.

graph features of MotoCalc help sort out a greater number of possible combinations at one time. MotoCalc 5.01 is available as a trial version on their web site.

So which of these programs do you choose from? At $35.00 to $40.00 each, there is room in most individual's modeling budgets to purchase both. Both have individual strengths - ElectriCalc 2 has a better model database whereas MotoCalc 5.01 is capable of handling electric ducted fans. The end results from both are fairly close in comparison. MotoCalc's analysis includes the speed controller's characteristics, so I would think that the numbers generated are a bit more accurate, but both are more than accurate enough to make useful comparisons for our general modeling purposes. I have loaded the characteristics of a couple of my electric models and the results are close to what I perceive the model is actually doing or capable of.

I use both programs quite a bit doing "what if" scenarios and looking at the performance of existing kits or models such as the Cavazos Sailplane Design Vortex SP I reviewed recently. I tend to build more models on paper or in my head than I have time to actually do on the building table, so it is nice to have both these programs on hand. In the end, that's why you would buy programs like ElectriCalc 2 and MotoCalc. When you do get the chance to build a model, you want to be assured that it will be a model that flies well.

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

Other Sources:

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

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

One item that will be of notice to you when using either of these two programs is how the performance is affected by the choice of propeller. There are a number of different sources for propellers; a propeller from Master Airscrew will not necessarily match up evenly with one from APC. Somewhere along the line I had picked up the hint that APC props typically need to be bumped up one inch in diameter to match the output of other brands. Both programs show this to be generally true so there is indeed something to it.

In terms of understanding propellers and how they work, I picked up a book at the local hobby shop that was very helpful. Called Model Airplane Propellers - Selection and Performance, it is written by Howard Chevalier who happens to be the electric columnist in R/C Report magazine. Howard is a professor emeritus at the Department of Aerospace Engineering - Texas A&M University. Howard does a great job of presenting the information and aerodynamics in such a way that anyone should be able to understand and pick up on the concepts being presented. In addition to the book itself, there is a software program (included with the book) that can be used to help in the selection of a propeller for your purposes, whether it be electric, glow or gasoline. I paid $24.95 for my copy at the local hobby shop, but also see it is available from New Creations R/C, as well.

Next time, we'll look at a couple of simple, inexpensive Speed 400 powered models that anyone can build and gain confidence in flying electrics.

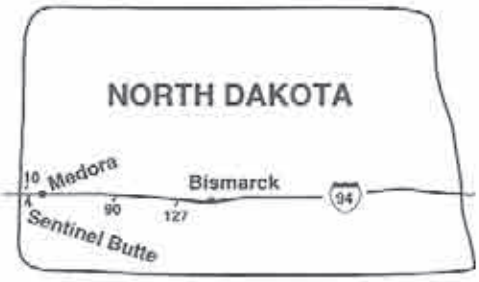
Good Health and Good Lift!! ■

HAVE SAILPLANE, WILL TRAVEL!

By Tom H. Nagel
904 Neil Ave.
Columbus, OH 43215
tomnagel@iwaynet.net

This column is dedicated to soaring vacations.

This month's contributor is Al Nephew, who teaches philosophy at the College of Scholastics in Duluth, Minnesota, and flies HLG and foamies with his 12 year old grandson. He has been a modeler since 1950, but did not start flying RC sailplanes until 2 summers ago.



Al plans on following up this article with a slope scouting trip this spring or summer, and has done extensive map and phone research on site ownership, accommodations, and even airline connections. He can be reached at <anephew@css.edu>.

HOBO SLOPING IN THE BADLANDS

Field Research by Al Nephew
Graphic Design by Tom Nagel

Many folks complain that crossing North Dakota is a monotonous, boring drive. However, to the sloper, which I have recently become, that drive is *anything* but boring, when traveling in the western half of the state, and certain areas in the eastern half, such as Valley City, which promises great sloping adventure. Actually, a person could 'walk about' North Dakota for weeks, and likely discover treeless, slope soaring sites most every day; and, of course, there would be no lack of wind to power any sailplane one might happen to bring along.

One potential difficulty that could be encountered when attempting access to a likely looking site area, is the possibility of controlled access, due to antennas, for example. One day, I drove across a cattle guard to reach a butte at Exit 90. I recall seeing a tattered scrap of paper hanging from a fence post, which might have warned against trespassing, but I didn't stop to see what it said. Thinking ignorance is bliss, I continued on my way, secure in the thought that there was little chance that anyone would object. My passengers, however, were not westeners like myself, so were a bit nervous about my approach to this sort of situation. I simply figured that I'd drive right in and if anyone came along to ask my intent, they'd see that I meant no harm. Having youngsters along always helps, too, especially if you're teaching them to fly. So, I drag my daughter and grandson along whenever possible, although my grandson doesn't ever seem to resist.

The next time I drive across North Dakota, and find some extra time to spare, I'll check out a few more potential sites. Last summer, I did discover a fine butte, festooned with antenna at the top at Exit 90 off of Interstate 94. There is a road all the way to the top, wind is good from any direction, and it's right next to the freeway exit.

There is another butte at Exit 127 off I-94, which features the World's Largest Holstein Cow (statue) part way up. The slopes appear to face east and west, as well as other directions, too, although the Cow is an obstacle on the north side. From Mount Holstein, there is a road up to the Cow, and not too much of a walk from there.

Around Exit 10 off of I-94, plus a drive of just a few miles headed south, is Sentinel Butte, a very large mountain for these parts. Road access is likely, as there's antenna at the top. Unfortunately, I did not have time to stop and check it out.

I obtained a topographical map from the US Forest Service, which details other numerous buttes and plateaus, including one near Medora, which looks likely a good candidate for dynamic soaring.

There are certainly more buttes in North Dakota and Montana, but not many appear as approachable as those mentioned here. At least, I didn't see any easy access to other sites while speeding down the freeway. If any of you find yourself traveling through North Dakota, and you find the time to check out any of these sites, or others, please drop us a line and let us know what flying conditions you encountered.

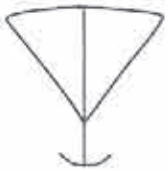
The notion has occurred to me that someone, who has the time to travel, could make friends with farm folks, and set the stage for other slopers who might find themselves traveling through the state. Indeed, special signs could be prepared

HOBO SIGNS

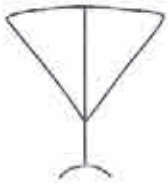
Graphic Design by Tom Nagel


Slopers Welcome

Foamies Allowed


Friendly Hang Gliders


Beware of the Zagi


Unfriendly Hang Gliders


No Sloping Allowed

No Foamies Allowed


Welcome to Roswell

(That's not a PSS site, buddy. It's a gunnery range...)

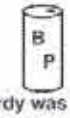
Scale Ships, Only


Beware of the Rotor

Dangerous L. Z.


Radio Interference

Cows. Take care landing.



Gordy was here!

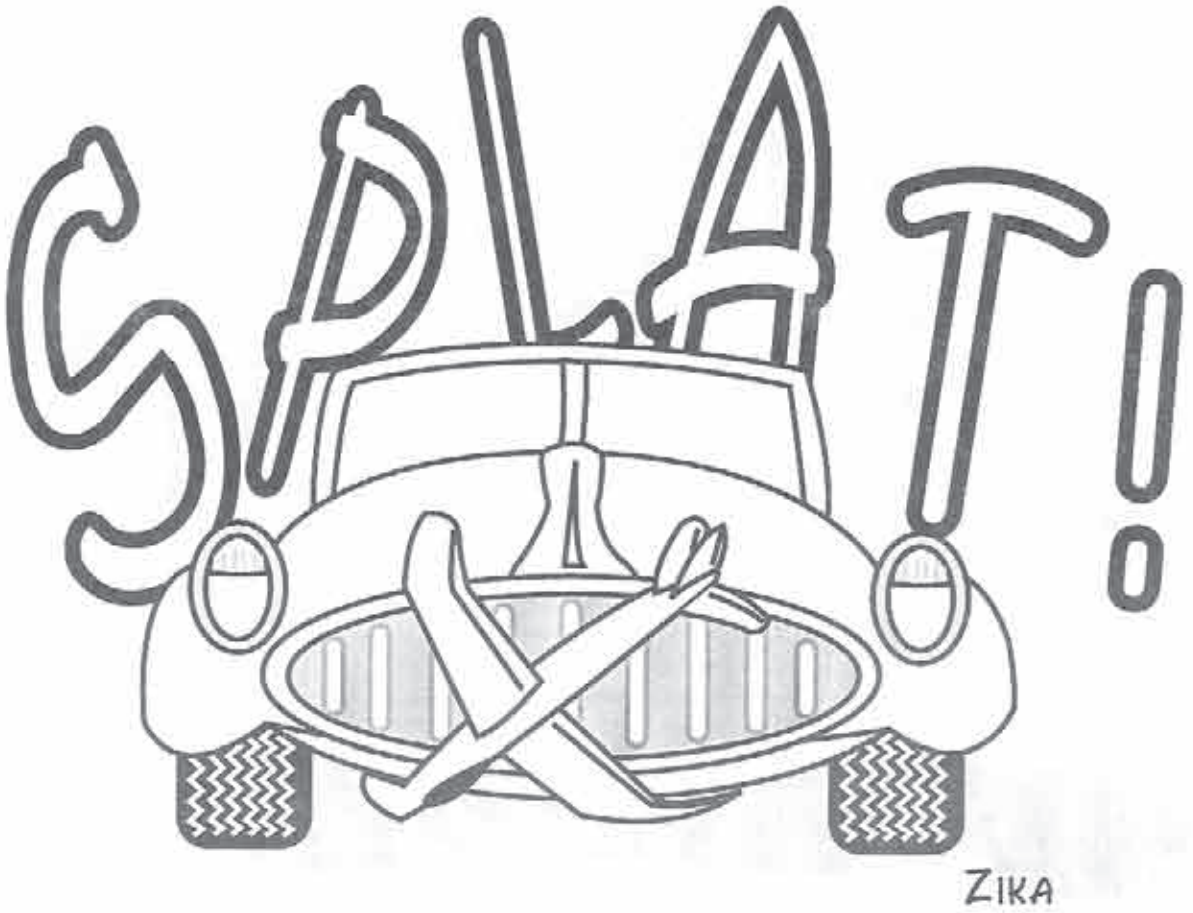
Wurtsing Site

and posted on gates such as the one I mentioned earlier, either welcoming or warning the sloper to beware. ■

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* ■

Disclaimer: The information published about site access is believed to be accurate as of the date of publication; neither the author nor the publisher assume any liability or responsibility to any person or entity with respect to any loss or damage caused, or alleged to be caused, either directly or indirectly by the information included in this column. Flying site ownership, management and rules often change without notice. Fliers using this information are advised to proceed with good sense and politeness. Respect the owners and other users of the site. Fly safely.

■



HOW TO MAKE A PERFECT LANDING

...into the top of a tree

(difficult for some, easy for others)

It was a beautiful, blue sky day. Not too cold for the end of February. It was the first day of the Pensacola fly-in and already there were some fifteen of so really beautiful, large scale sailplanes being towed up every few minutes or so. It was quite windy, but not too bad. I had already had one flight on the 5 meter 1/3rd ASK 18 and went up for another. I didn't much like the landing I made on the first flight and wanted to nail a really good one this time.

I released at height, caught a little bubble of lift which gave out. I found a couple of others, but I was coming down more often than not. It really felt good to be flying again after several months off. I was having a ball!

One of the nice things about sailplanes is that you're always fishing for lift. There's always the chance that you can catch a thermal near the ground and get back up again for some more airtime. Catching lift just above the ground is just the greatest! The lower the lift, the more fun it is.

I guess I'm in the habit of trying to catch lift just before landing. Every once in a while that happens. Just one last turn with the wingtip almost scraping the ground and, instead of landing, the glider gains a little, then more and more, until it's back up and a speck in the sky. How I love those low thermals!

Anyway, on this day, I was getting lower and lower until it was time to make the final approach and land. I flew the downwind leg and, when I turned crosswind, I felt a little bubble under the right wing and so did another 360, and gained a little. Then I made another 360, and another. It felt great! I was drifting over to the right...

I saw the trees. How could I miss them? Another 360. There they stood big as life to one side of where we were landing. Another 360. I was absolutely certain that I was flying way in front of the trees; when the ASK 18 gracefully flew into the top branches, boy was I shocked! How could that tree be where it was? I just knew it was way further back! The damn thing up and grabbed the ASK!

It was a perfect landing, maybe fifty feet up, way out into thin branches. The glider snuggled down and hung there waving in the stiff breeze. A few guys ran over and waited for the model to fall out of the branches, but it remained stuck there, blowing back and forth in the wind. After a few minutes, the wind picked up a bit and we were afraid it would come sloshing out of the tree and really get smashed. So far, so good – the ASK hung in there.

Rusty had a Pensacola phone book in his truck and Asher started phoning names listed under "Tree Care". After a few calls, it became apparent that every "tree pruning, transplanting, topping, stump grinding, branch trimming, 24 hour service" soul in the area had either gone for the holidays or had taken that Friday off. We worked right through the yellow pages, and after an hour or so, and more than thirty calls, the prospect of getting the ASK out of the tree looked bleaker than ever.

It was then that detective Rusty Rood found out there was a fire house just down the street; he found the telephone phone number pinned to the front door (no one was in). Asher called and got the Fire Chief's wife.

"The Chief's in the showerrrr," she drawled in an Alabama accent.

"We have a large model glider stuck in the top of a tree. Could the Fire Department give us a hand gettin' it down for us," we asked.

"You all just relax now. The Chief 'll be there just as soon as he dries his hair. Fifteen minutes – no more!" came the answer.

All during this, we eyed the ASK, still flopping in the tree branch.

Sure enough, fifteen minutes later, a group of cars parked and a nice shiny fire truck pulled up under the offending tree. Sprouting legs like some sort of huge red bug, two guys got into the bucket in the rear and headed for the ASK.

A nice looking lady with a clipboard and pen walked up to me. "Are you all the owner?" she asked.

Feeling like an utter fool, I mumbled a "yes".

"Yaurrr name?"

"Address? ...Rochester, eh? My aunt lives in them parts. Lot o' Rochester, eh?"

"Yer phone number?"

"Social security number?"

The more questions she asked, the more curiouser and curiouser I became...

Then she pointed to the glider. "How did ya get out of the glider and climb down that thar tree?"

It seems that between the noise of the water running in the Fire Chief's shower and the bad cell phone connection, somehow "model" glider got lost in the translation. They'd come to rescue a real sailplane,

which some dang fool had flown into the top o' that thar tree!

All this made for a most interesting day and the best part was that the ASK sustained little damage; it was back flying the very next day at site 8 (one square mile of TREELESS grass). I even managed a few landings without hitting anything!

There were many notable first flights over that February weekend: Pete George flew his new EMS 1:3.5 Duo Discus as did Asher Carmichael with his 1:2.5 LS 4 and 1:3 RIPO ASH 26; also Rusty Rood with his all glass Schueler & Fleckstein 1:3 ASH 26 and Tony Fiorentino with his monster 1:2.5 all glass ROKE Grob Twin Akro G-103. Asher's 1:3 Wilga towed the almost half-sized monster for the first time and Landon Grindstaff (with his unique Phoenix) tirelessly pulled up everything else in sight for three days running! Landing in a tree, however, was one first we would all prefer not to duplicate! In retrospect, it did add a certain spice to the weekend!

Thanks Asher! Thanks Rusty! We all had a great time in Pensacola!

In the Beginning...

Your radio is the direct link between your thought process and your radio controlled model. When you first started learning to fly, it very probably took you a lot of thinking for you to figure out how to steer your R/C model correctly. You first had to decide what you wanted the model to do (turn left or right, go up or down, etc.); then you had to figure out what to do with your fingers - which way to push the sticks to get the desired result. Some of the time you steered in the wrong direction, and sometimes you got it right. Giving the model the correct commands was sometimes a slow and laborious process. You probably were not familiar with the radio in your hands and you really didn't know what was required to make the R/C model fly properly in the first place. What control you needed and when to do it was still a bit of a mystery. Not surprisingly, the more familiar you became with the process (both physical and mental) the better you flew.

Remember your first flight?

Do you remember your first R/C flight? How difficult it was to steer the model when it was flying towards you? Think, think! Don't think "right and left" any more. Think "prop up the wing that's down to straighten out". What a lot of mental effort it used to be to fly the R/C model when it was headed directly at you! Now (hopefully) all that's very familiar to you and you no longer give flying any thought. You simply steer the glider towards you and land it. No big deal.

The better you know how to fly...

The same is true of advanced aerobatics. In the best of all possible worlds, you become one with the R/C model and your fingers move almost on their own. You no longer have to think how to do it or what to do. You just "fly" the airplane and make it perform the maneuvers you want. Your thoughts flow directly to the model and you no longer have to figure out which way or how to move the sticks. It's almost as though your fingers now act on instinct.

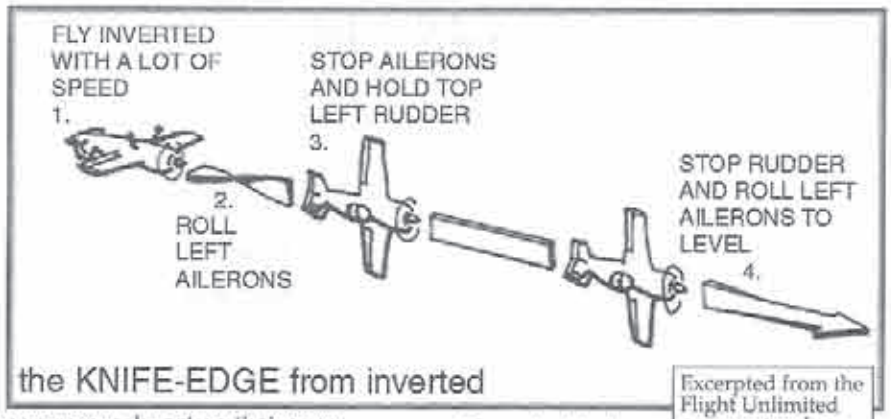
As you might expect, familiarity also makes it much easier for you to fly your desired stunts. You will be thoroughly at home with your aerobatics when the various maneuvers are familiar enough to you. There will come a time when you simply fly, fly, FLY! That's when you're really going to have a ball! Let's try get you there as fast as possible!

Go Get Your Radio!

Now let's play a little game. Go get your radio and, while holding the sticks, let's pretend to fly. Just read along and move the sticks for the following maneuvers we are going to run through. For the moment, forget about the all-important airspeed and height. Let's just move the sticks and see if we know what to do...

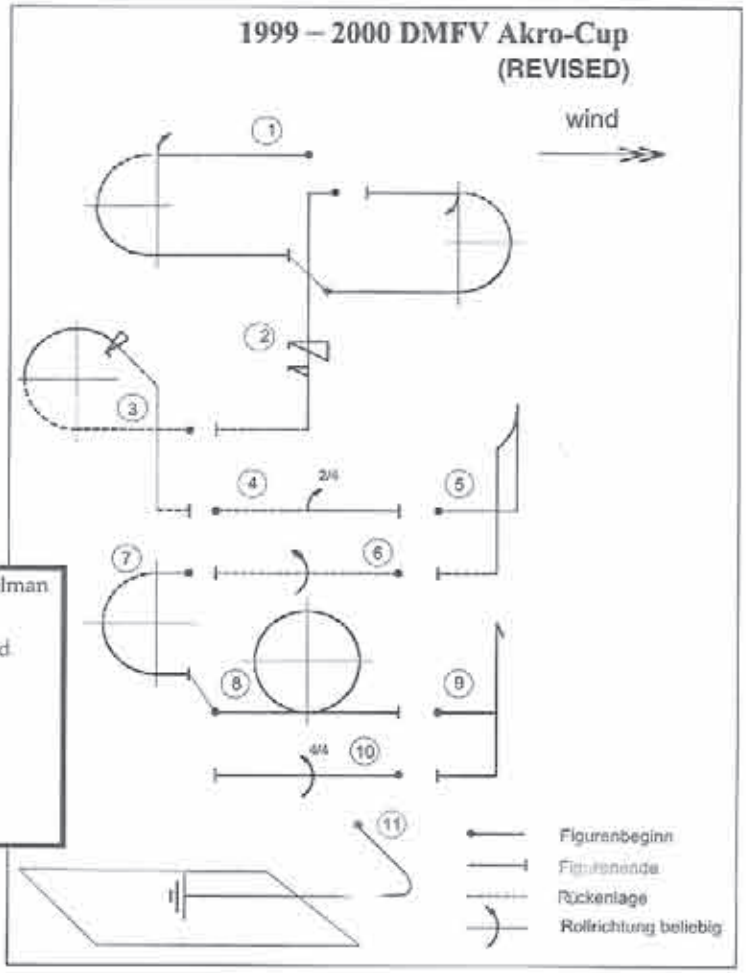
Pretend to Fly...

- Straight and level flight coming towards us. Now turn right 90 degrees.



the KNIFE-EDGE from inverted

- Do an inside loop, then level flight.
- Do an outside loop, then level flight.
- To an Immelman to level flight.
- Roll inverted and continue level (inverted) flight.
- Do a 360 degree circle (you are still inverted) to straight and level; did you push down elevator in the turn to keep the nose up?
- Fly straight and level inverted.
- Roll right and do a knife-edge. (Do you know which way to push the rudder stick to give top rudder? If not, a little review is in order.)
- Start again - straight and level flight, roll left and fly knife-edge. (Which



1. Split-S followed by an Immelman
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. Approach & Landing

way is top rudder?)

If you know this, skip the following review.

Top Rudder Review

Are you still holding your radio in your hands? OK, ready or not, here we go! Let's run through the 4-point roll again and pay particular attention to how to push top rudder.

In your mind's eye, dive to gain a lot of airspeed, then fly your glider to straight and level. Now:

1. Roll to the RIGHT (with ailerons) to the 90 position (stop the roll) and add top LEFT rudder. Notice that both sticks push out away from each other - so when you roll to the RIGHT top rudder is always to the LEFT.
2. Roll RIGHT (with ailerons) to the 180 inverted position (stop the roll), add down elevator if necessary (to keep the nose up).
3. Roll RIGHT (with ailerons) to 270 (stop the roll) and add top RIGHT rudder (now the aileron and rudder sticks both push to the RIGHT) – so when you roll RIGHT from inverted, top rudder is always to the RIGHT. Note that both sticks push in the same direction.
4. Roll RIGHT (with ailerons) 90 back to level flight.

A similar but slightly different pattern happens with the four-point roll to the LEFT. This time it's:

1. Roll LEFT (with ailerons) to 90 and now both sticks push towards each other (again) in the OPPOSITE direction, giving you RIGHT top rudder.
2. Roll LEFT (with ailerons) to inverted and add down elevator if necessary.
3. Roll LEFT (with ailerons) to 270 and add top LEFT rudder - both sticks push in the SAME direction to the left.
4. Roll LEFT back to level flight and fly straight and level.

Let's make Top Rudder simple.

The Top Rudder Rule

...And so this gives us two very simple rules to remember:

- From level flight, to go knife-edge, the rudder stick always pushes in the OPPOSITE direction (from the ailerons).
- From inverted flight, you always push the rudder in the SAME direction (as the ailerons) to go knife-edge.

The trick is not to have to think!

As I said before, the real trick to flying aerobatics is not to have to think about what your fingers are doing. Just "get" the above two top rudder guidelines into your head and you will always know where top rudder is.

Again, from level flight, sticks opposite; from inverted, sticks the same; and that's all there is to the top rudder game!

Let's try the imaginary flying game again.

Are you still holding your radio? Imagine the following flight.

Try:

- From inverted, roll right to knife-edge.

Start over and try:

- From level, roll left to knife-edge.

Start again and fly:

- From inverted, roll left to knife-edge.

Start another flight and do:

- From inverted, roll right to knife-edge.

Got it now? Simple, isn't it?

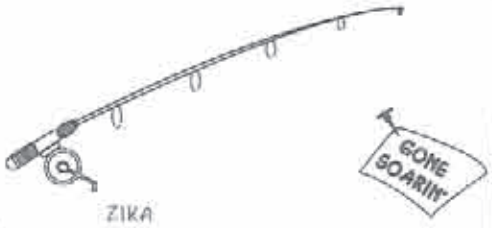
Knife-Edge from Inverted

All the same rules of aerodynamics, inertia and gravity apply to inverted knife-edge. You must be going fast enough to hold the maneuver, and when you're done with it, you can roll to level flight, inverted flight (again) or even do a stall turn, half loop, whatever...

Now you can easily fly knife-edge from inverted (by rolling right or left). You now know which push the rudder (same way as the ailerons) to get top rudder. No problem! Go out and tear up the sky!

Don't forget the happy and gentle landings!

Good flying! ■



HITEC Focus IIISS AM Radio

Dave Register
Bartlesville, Oklahoma
RegDave@aol.com

Looking for a really neat way to simplify your small airplane flying enjoyment? Trying to help someone get started with a R(udder)-E(levator)-S(poiler) or RE-F(lap) design? How about a V-tail poly ship? How about a V-tail HLG with flaps tossed in? Are you a mad combat sloper and want some flap control for your 'kill' maneuver? Want a pitcheron ship ala Wingeron Bob or the Sig Samurai?

The latest offering from HITEC R/C comes to the rescue in a really neat little package called the IIISS. This is a follow on to their popular IISS (2 channel single stick) and is a single stick transmitter with a third channel (flap, spoiler, whatever) conveniently located on the rear of the transmitter (Tx). It also sports channel 1-2 coupling and channel 1-2 servo reversing to make your life REAL easy.

I bought a IIISS a few weeks ago and have had it out on several occasions now (V-tail HLG installation). Although I've not flown a IISS, the slope guys have spoken so highly of this unit that the IIISS seemed a perfect fit for HLG, RES, Nostalgia and a few other things. The V-tail mixing is unusual for a radio of this configuration. Although it's offered only on AM (27 MHz and 72 MHz), it is a narrow band unit and has exhibited rock solid performance over the past several weeks.

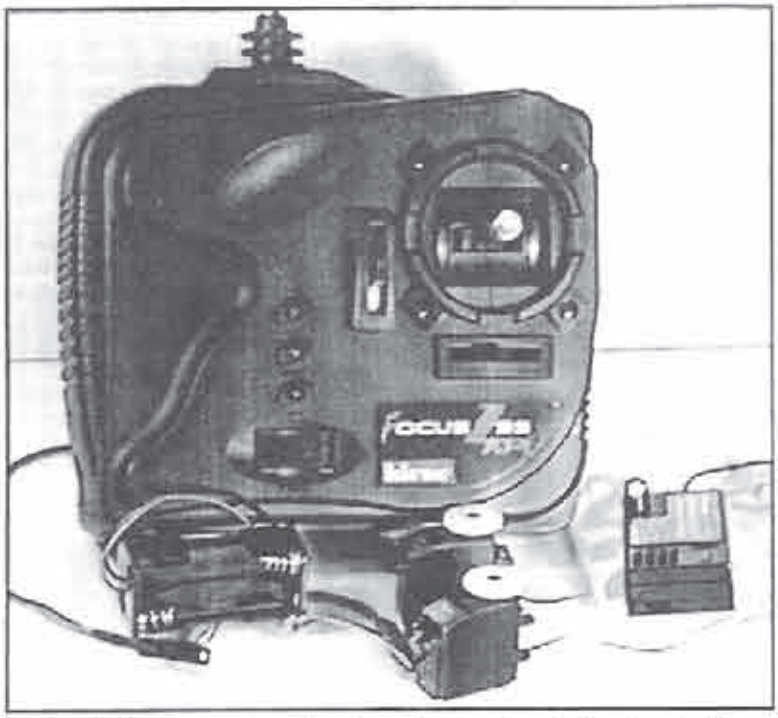
TRANSMITTER:

As seen in the accompanying picture, the IIISS is a very compact little transmitter design. It fits nicely in the left hand with an indentation on the front panel for the thumb and part of your palm. A very comfortable fit and excellent grip leaving your right hand free for launching. With the left hand snugly tucked in the recess on the front, your left index finger very naturally sits on the 3rd channel control on the rear panel while your left 'pinky' rests in the crystal recess on the back plate.

For the lefties amongst us, don't despair. The rear of the Tx has a rounded ridge on the right side which comfortably fits the right hand, as well. As long as you can steer with your right hand, the grip is still very solid for a left hand launch. Once airborne, the left and right hand grips give a very comfortable feel to holding the Tx. One of the nicest ergonomic cases I've put my paws on lately.

The rear of the Tx also has three recessed switches. These are easily set using a small screw driver to slide them, but are almost impossible to move under any normal gripping or flying conditions. The switches are assigned to channel 1 and 2 reversing with the third switch for channel 1 and 2 mixing (V-tail type coupling - mode I). Note that all of these functions are hard wired without ATV, differential, etc. Channel 3 can not be mixed with any of the others. Trim tabs are available on the Tx gimble for channel 1 and 2. No trim settings are available for channel 3.

A recessed slide switch activates power for the transmitter. Battery condition is noted



by three lights - green for fully charged, amber for normal charge and flashing red for 'better land pretty quick'. Batteries are eight AA alkaline dry cells (not supplied) but can be replaced with nickel-cadmium. There is a two wire plug inside the battery cover for re-charging nicads if you choose this option (charger not supplied with the radio but Hitec's CG-22A or 25A work with this system).

RECEIVER:

The IIISS uses a 3 channel narrow band AM receiver specifically designed for this system (designated HAS-3MB). At this writing, replacement receivers have not been noted as a separate item on the Hitec web site (http://www.hitecrcd.com/) so I'm not sure if they will be available for multiple ship installations (I hope so!). Along with the receiver, two servos and a battery/switch harness are included in the system. I ordered mine with the HS80 servo option and this gives you a AAA battery harness for use with alkaline batteries (not supplied). Nicads can be substituted here as well, with the battery lead being disconnected from the switch harness for charging (charger not supplied).

COMMENTS:

Obviously, I'm pretty impressed with the features of this little radio or I wouldn't be writing it up. Hitec does not sell direct but several suppliers now carry this unit. You may spot it in ads in the national magazines. Two sources I know about are Indy R/C (http://www.indyrc.com/) and Studio 'B' R/C (http://www.studiob-rc.com/), but I'm sure it's also available from your favorite dealer.

As mentioned, the transmitter is exceptionally comfortable to hold and the single stick gimble is very smooth and precise. Centering is great and servos and trim tabs have indents so you know how many 'clicks' you made to get it right where you want. The capability to convert to nicads is very handy. Please note the orientation of the connectors when you insert the Tx pack since it's not quite square and will jam pretty tight if you're off by 90 degrees. (Guess how I learned THAT little fact!)

If you don't want to put a set of nicads in the battery holders, Hitec sells both a Tx battery pack (#58207) and an Rx battery pack (#57403) that fits this radio. Take a look on their web site for more details I'll also note that the Futaba 8 cell Tx pack (NT-8LP from Futaba) also fits the Tx. Same connectors and polarity. But it won't make contact with the spring clips unless you cut down the guards around the individual connectors on the Futaba pack.

There are a couple of other things worth noting. First is that the Rx case is a titch wider than the RCD535 and RCD555 receivers. If you've built a hand launch around these receivers, you'll need ~1/8" more clearance. May not seem like much but sometimes that makes a difference. Dimensions of the receiver are (my measurements): 1.8" x 1.25" x 0.7" so it's between the 535 and 555 on length and wider than both of them by 0.15".

Next thing is that the Rx servo plugs are cut out for Hitec connectors (naturally) and Futabas won't fit (JRs will). So I popped off the case and did a little work with an exacto knife and now my Futaba connectors work fine. With the Hitec servos supplied, be sure that you plug in the connectors with the black wire to the outside of the Rx case.

As with any R/C equipment, a range check is a valuable exercise before each flying session. No comment is made about this in the manual so I paced off ~ 100 ft. with the antenna collapsed and still had solid response. A subsequent flight near the limits of visibility with my old eyes still gave excellent, glitch-free control.

Although this radio is ideally suited for RES/REF control for sailplanes, it also fits a great niche for small power ships and electrics. My personal recommendation for a power ship would be to go with a nicad flight pack. Sometimes spring connectors can give intermittent contact in a high vibration environment. The springs in the flight pack are pretty tight, so this is probably not too much of a question with this radio.

SETTING UP A V-TAIL:

One of the great features of this little radio is the V-tail capability. Hitec has set this up with control throw limits in the coupled mode. That means that the throw for full elevator and full rudder is the total throw available for the servo. So in V-mode, elevator (or rudder) control alone is 1/2 the full servo travel. In my experience, V's are a bit pitch sensitive but slower in yaw. So you'll probably want to set up your yaw control first and then de-tune your thumb a bit for elevator.

Iam Kessler noted on the RC Soaring Exchange that the IIISS assumes a particular orientation to the servo installation. I checked this out with mine and found this suggestion was right on the money. The servo mounting for proper V-control assumes that the servo arms are pointing in opposite directions (both pointing away or towards the center line of the fuselage, for instance). Or, if you mount them on their side, the splines are pointed in opposite directions (again, away or towards the fuselage center line). If the output arms (vertical mounting) or splines (horizontal mounting) are pointing in the same direction (both left, for instance), no combination of servo reversing will get you there. Although this seems a bit limiting, consider the value in this unit and think through your servo arrangement ahead of time to make it come out OK. And thanks, Iam, for sharing your experience with the rest of us!

With the servos mounted in the proper orientation, the set up for V mode is very easy. First, turn off V-mode. While looking at the REAR of the plane, observe the motion of the control surface attached to the pitch axis of the transmitter gimble. Set the servo reversing switch so pulling down on the stick gives an upward motion to the control surface. Now look at the other control surface, also from the REAR of the plane. Set the reversing switch for this channel so that pushing the stick to the left causes that control surface to deflect to the left. Once that's set, turn on the coupling switch and you're all set. Pulling down on the stick should move both surfaces up. Pushing left or right on the stick should push both control surfaces to the left or right respectively (again, as viewed from the rear of the plane).

RECOMMENDATION:

No question. Buy this little gem if you want to keep your small plane flying real simple. The light weight, dry cell packs and small size make it perfect for traveling with a poly ship with or without V-tail setup. For slopers, it gives you one more function for a little bit more fun and not much more price. If you're after flaperon coupling, you can't get there from here (and Hitec makes no claims to that effect). However, there's a neat little mixer from Studio B (web site noted above) that makes a great complement to this radio and the IIISS for additional mixing capabilities. Estimated flight pack weight (everything in the case) is ~ 2.75 oz. (Rx, harness and AAA alkaline batteries). Eliminating the harness and going directly with 225maH nicads soldered in will be ~ 2.4 oz. Any way you put it together, it's great for HLG, slope, RES/REF, V-tail poly, pitcheron or any number of special projects. Go buy. Go fly. And have a great time! ■

GORDY'S TRAVELS

A Winning Hand
The Full-House Highlander EPP

by Gordy Stahl
Louisville, Kentucky
GordySoar@aol.com

I was hanging around Visalia '98; the event was over; Michael Volz, George Joy and the Mad Aircraft boys were there, too.

We were basking in the after glow of the event and doing some soaring. George and I had our Psyko's; Michael had my Citation 120 V tail ship. Oh yeah, and a pal of Mike Fox's from Iowa had a Psyko, too. (Michael and him managed to have a little mid-air near the end of the day; no serious damage though!)

I was watching the Madboys high starting some foamie Highlanders, without much success. It was pretty pitiful, you know, watching foamie sloper guys trying to thermal. So to put us out of our misery, I walked over and offered to trim their plane... It only took about two 2" lead wheel weights taped under the rudder to get it so it had a glide path.

We hooked it to the winch and up it went. First, they couldn't believe the launch, straight up and way up. I didn't push it because I wasn't sure about possible flutter. While I didn't go for a big zoom at the end, there was plenty of height.

I worked with the trims to get it tracking and then headed in search of a thermal. The evening air was cooling so it was buoyant; I found a decent core and began working it. Once I was satisfied that the ship was capable, I brought it down for some hand tosses.

After two or three, I managed to hook a nice piece over the launch area and worked it up to launch height. Next, I gave control over to the Madmen and coached them in the finer art of flat turns. Listening to their glee really kind of capped the event. Actually, George did most of the coaching; he is an excellent instructor.

We flew both the poly wing and the full house six-servo wing on the same fuselage to compare their performance. I felt that the full house version flew a lot like a Falcon 600. The poly was lots of fun and incredibly simple to guide around the sky.

Alba-Toss Micro HL

My taste has never been toward foamies much less TD foamies, but the Highlander kind of changed my mind. Yes, I know that all of the two-meter TD foamies fly pretty well, but I didn't fly them. So, I guess it made sense that the Highlander hooked me.

Anyway, that's what lead to this trip, on the road to fine-tuning my own Full-House Highlander.

(First let me state that if you don't have an upper level comp. radio, you can still build this version. You just won't be able to capitalize on all the talent a full house ship is capable of. I use the Airtronics Stylus, which can pretty much do anything asked. The TX you choose should be capable of operating two flaps and two ailerons independently. Most six channel TX's won't. Many of the newer 8 channel TX's will. You can run a 6 servo Highlander on a 4-channel radio, but it involves Y harnesses to combine the flaps into the throttle channel and the ailerons into the aileron channel.)

Let's start off with the construction. Not being a foamie guy, it was totally alien for me to look at those really nice cut, foam parts and think about hacking and burning at them for servo holes and linkage rods. Then spraying them with contact cement, and taping... I got to tell you it took me awhile to even begin. (If you travel, you will likely find at least one of the rooms I built it in, as the floors will probably still be tacky.)

In the end, it was easy, though. I tried to follow the instructions, but I couldn't just build it the way they said. Not me – I had to modify it, so it would be 'better'. Goofy, I know. Here's a kit that flies great, as is, and I have to make it better. I thought about that for awhile, and realized that it wasn't to make it 'better', but rather to personalize it. That made it okay!

I want to make it clear that the kit was designed by some of the best TD guys in the nation. No not JW or DP or BC, but guys whom have built lots of TD ships and are friends of the Madguys. They thought of the things I did and decided that it wasn't worth the time or effort to bother with. What they did keep was a nice kit, with things left the way the kit comes cuz it works.

Now, I wasn't interested in an unbreakable RC ship. I didn't care if it was crash proof. I am pretty well past the crashing phase. Oh yeah, my planes crash, but that's due to broken wires or dead batteries, the perils of traveling with your planes. Anyway, what I really wanted was a good 2 meter ship to fly, and that is where my mods come in to this article.

I decided on Volz Micro Maxx servos for their power speed and gear strength. Kind of over kill if you figure the price of the kit, versus a composite ship, but again I wasn't thinking of this ship as a 'foamie', but as MY 2 meter.

The receiver I chose is the new Berg 6 channel micro from RC Direct. Single conversion, FM, extremely tiny, not that I needed a small RX, there is plenty of room in the fuselage.

I followed directions and chatted with Mad Andre and Mad Mark about mods I was considering. His design team had tried and discounted most of them. I knew that I wanted the balsa tail feather option, since the coroplast wasn't stable (warpwize) enough for a real TD ship.

I also wanted the tail boom to be stiff to resist flexing under launch loads. So I added a 3/16" carbon arrow shaft up the bottom of the boom from the towhook plate all the way back to the end of the fuse. I simply took a soldering iron and routed a slot for the shaft, then hot glued it in. I tied it into the towhook plate by notching it, and then adding a glass wrap to contain it. My hope was to avoid a focal point for a break.

The hedral listed for the flat wing is fine, but I have always leaned toward a flatter wing look. So instead of 5 degrees of dihedral, I decided on 3 degrees.

I moved the 700mah AA square 4 pack of cells as close to the nose as I could get it and still leave about 1/8" of foam around it. Then I stacked two Volz Mini Maxx servos one above the other, again about 1/8" behind the battery. The rudder exits on the right side and the elevator servo on the left (looking from the rear). My thoughts were to keep the weight up front to avoid adding lead.

To cut out the chunks for the servos, Rx, battery, I used a fine hacksaw blade that I had trimmed to a point. (Although a long Exacto blade would work fine.) I traced my parts with a marker; then cut. It's kind of weird to cut the RX hole, the wing pin hold-down block and the towhook block.

There is one other mod that I made. The plan showed the towhook block being located about in the middle of the fuse, between the wing saddle and the bottom of the fuse. I decided to use separate blocks. The original block went in just to serve to hold the blind nut for the wing hold-down bolt. The block I added was to hold a blind nut for a real two hook versus the wood screw type hook supplied, and to contain the carbon tailboom shaft.

Okay, I added some weight. But the ship

still comes in well within acceptable limits; my old balsa, full house Whisper weighed 45 oz., which is where this ship weighs in. New composites are coming in at 31 oz., but also have accommodations for ballast.

For those of you who are not used to EPP, it is not a material that is manufactured to close tolerances. None of its commercial uses call for close tolerances of weight or density, like other foams purchased and used by the military.

A pattern cut in one piece makes a perfect spar slot; an identical cut in another leaves an undersize slot. Warp memory is typical. So I found that I had to trim some of the panels to end up with a straight trailing edge and had to make a spar-sanding block to align the slot for the spar. Not a lot, but some.

I added some uni-carbon to the bottom of the spar and to the joiner to add some anti-shear insurance to the spar. Aligning the horizontal stab was no big deal. I did it by following the directions, and locked it in when I glued in the carbon arrow shaft.

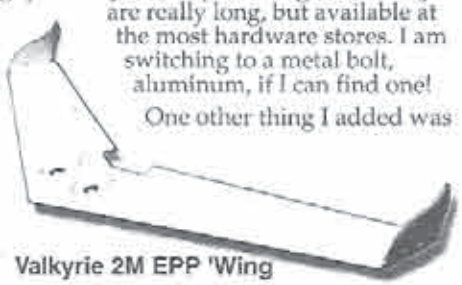
I chose to run the flaps out to the tip panel break, about 18". The ailerons are about 16". I did that with hopes of adding some extra flap landing speed control, since the material is only 1 1/2" wide. I figured on mixing flap to aileron for added roll control for when I would have the ship on the slope.

What I found was that the flaps worked well and so did the ailerons even without the mixing. No, it doesn't roll like a pivot wing but, with enough speed, it rolls.

On the first couple of hand launches in cold, wet, and windy air, it flew pretty well. It was obvious I had shrunk in some wing twist; no big deal. I was able to throw and get a good enough glide to return for the catch. I didn't add any lead and am flying it with the balance point at 4" behind the leading edge. I found that on the slope that makes it pitch reactive. Don't even think of reading that as pitch sensitive; it is that of course, because if your ship takes lots of elevator to make it move, then it isn't trimmed. By reactive I mean that when it comes into heavy lift it sticks its nose up hard. (Good for indicating thermals, but annoying on a turbulent slope.) The plan recommends 3 1/4" back from the L.E. My tow hook is located at 3 1/4" and is fine on tow.

I re-heated the wing that had the obvious twist. I also balanced the wing laterally. The slope winds were gusting to about 20 mph and it performed like a typical full house TD ship. On landing in the rotor, I landed short behind the hill and it nosed in. That resulted in a broken wing bolt and no other signs of the doink. That is a clue guys. Carry some spare wing bolts. They are really long, but available at the most hardware stores. I am switching to a metal bolt, aluminum, if I can find one!

One other thing I added was



Valkyrie 2M EPP Wing

ME P.1111 Flying Wing

The History of MAD Aircraft Design

I asked the Madmen to give me some background on how they got started in the foamie manufacturing business. What I got was their life history. After you are done reading this interesting history, you will even know their sock sizes! ...And so it goes. - Gordy

MAD Aircraft Design was started by a couple of old high school buddies from Arcadia, California, Andre Gottmers and Mark Pavey. Andre has been in R/C flying for about eleven years and has been flying R/C sailplanes for about three years. Mark has been an aviation buff all his life, but has only been flying R/C for about a year and a half. Andre's background is in custom cabinet making, general construction, and quality control. Mark's background is in sales and marketing of packaging materials and techniques, plus inventory management.

It all started one day following a day of combat. Andre had already built a DAW P-51; together, we had built a DAW Komet. When we saw a gentleman on the hill flying a scratch-built, foamie Hellcat, we were inspired to build our own foamie. After a few weeks of research, we decided to go with the obscure Me P.1111. We got our three views from the book "Tailless Tale" and the internet, and went to work scaling up the drawings. Next, we had to decide on the airfoil. After doing some research on flying wing airfoils and getting some tips from Wade Kloos, we decided on a starting point for the airfoil. Fortunately, a few months earlier, we had already gotten some limited core cutting experience while doing some glass over blue-foam bagged wings, made for Charlie Richardson fuselages, which we got second hand. So, we got out our hand made bow out and went to work. The cores were very challenging to cut out of EPP, considering the root chord is about three times the tip measurement. It was a good set of cores to cut our teeth on. This kit proved to fly very well and, after pressure from flying buddies, started cutting cores and offering it as a kit.

Our next plane came about from necessity. Simply, Mark was getting tired of rebuilding his Gentle Lady after every landing and was considering buying the DAW TG3 or the Trick 2M Beater. After some deliberation, we decided that we would build our own and try to target a market with a good performing, all around, two meter EPP ship, under eighty dollars, with a bolt-on wing. We considered all of the flying characteristics of planes that we started out on, and came up with a very traditional, but streamline design. We tried several spar and joiner configurations and finally decided to go with a single, five-ply joiner at the center, with a basswood spar along the entire span. The wing bolt-on design evolved, a wing alignment pin protruding from the leading edge of the center of the wing, which fits into a hard-mount female part in the fuse. The wing bolt sits just behind the spar line, bolting into a plywood plate with a blind nut at the bottom of the fuselage, doubling as a tow hook plate. After the third prototype, we felt we were really close, but still had some issues to take care of regarding thermal capabilities, before the kit went into production. We started letting some experienced builders and pilots fly it and, finally, got some wise words from Robert Cavazos concerning incidence. When we finally went into production with this kit, we realized right away that it took a lot of time and parts; and, our production techniques were too slow. If this kit started selling like we thought, we needed to cut down on production time. We thought to ourselves, "Who has a lot of experience putting out quality kits and a lot of 'em?" The answer would be our good 'ol pal, Dave Sanders, who openly shared his production techniques with us and gave us a tour of the factory. (Note: We are forever indebted to Dave for his help, and for what he brings to the hobby.) After touring the factory, we invested in the Feather Cut system from Tekoa; we were pleased with the results. The kit went into production, word of mouth started to spread, and sales projections have been exceeded.

After the Highlander success, we designed and kitted the second best seller, our Curtiss P-40, semi scale, 48" EPP sloper. In the works, coming really soon, is a Valkyrie 2M EPP Flying Wing, designed for slope, but also with some thermal capabilities built in. It has five, carbon fiber spars to keep it from doing jumping jacks off the bungee. Also coming real soon, is a semi scale Baby Alba-toss, 29" micro hand launch modeled after the vintage Baby Bowlus. This plane has a durable 2 mil coroplast tailgroup on a CF/FG tail boom. It is a true parking lot, fly anywhere on your lunch break, plane. It is in the 5 oz. category and has a few more squares than other micros out there to get the wing loading down. This plane loves to just keep going, and signals lift really well. We are really excited about both these planes, which are in the final stages of release.

■

a 'cable thru' adapter used to pass TV antenna's through a wall. Radio Shack has 'em and they look like big plastic washers with a 1/4" tube, sort of like a mushroom. That adds lots of strength for the wing hold down since the bolt is dead next to the spar and the kit supplies a piece of Plexiglas to capture the spar on top. The cable-thru's tube also adds some extra surface area inside the foam, and still captures the spar from the top.

2 meter has sort of waned over the past few years, as the expense is nearly the same as an open class ship, and it takes up the same amount of time to fly; most of us don't have much time to fly both. I like the idea of flying a foamie in 2m events; the lack of cost, the near invulnerability, all make it that much more attractive. Especially if it is competitive, and I think it is.

A few notes about the materials preferred for foamies. Oracover or its other name, UltraCoat, is the material of choice. It resists shattering yet it adds lots of rigidity. Hot glue is a wonder, so get the long sticks for your gun. The clear sticks are dual heat, which means they work with low heat. High heat is fine, but there is a good chance of melting foam. Don't bother with the short 5" sticks; buy the long ones. I didn't use any other glues.

If you are building a full house version, install the separate tow hook block (1/4"x1"x3" long plywood), and a blind nut at 3 1/4" and one at 3 1/2". The 4/40 hook works, but I prefer the open class hooks as they don't get bent on landings. The wood screw type hook ends up loosening under winch loads.

Balance the wing laterally, and set the balance point at the recommended 3 1/4" if you are not a seasoned full house TD ship flyer. Not because it will be too hard to control or twitchy, but because it will be more sluggish, allowing you more time to think. The heavier the nose, the more lever it takes to move it.

If you are building it to fly, build and use the balsa tail feathers. If you are using it as a 'trainer' then use the coroplast. It works.

Don't use a tape hinge on the rudder, with the linkage rods set up, as it is; the load pushes the tape hinges loose. Get some of the flexi-plastic hinges and install them.

I am surprised at how well the covering has stayed tight and smooth on the wings, and you will be surprised at how nice you can make it look with some care. And, if you have specific questions, buy the kit first; then contact the Madmen or me. We build and fly sailplanes, then talk about them. It's more fun then!

What foil does it feature? Well, it starts with a 7037, but if you understand that a run-out of only a few thousandths makes it something else, you realize that the tape alone voids its foil validity. The fact that it thermals from a hand launch is assurance enough that the foil you end up with is very effective.

This trip was especially fun. I am glad I took it; hope you are too. Retrace my steps, buy it, build it, and find out for yourself!

See you on my next trip!

MAD Aircraft Design
15268 Rolling Ridge Drive
Chino Hills, CA 91709
(909) 606-0363, madair@madaircraft.com
http://www.madaircraft.com

■

THIS OLD PLANE

by Fred Mallett
Corpus Christi, Texas
FrederM@aol.com

Cutting Ailerons in Vacuum Bagged HLG Wings

Applying a sharp object to a shiny new HLG wing can be rather intimidating. This column covers the method I use to put ailerons or flaps into a vacuum bagged, foam core HLG wing. The methods could be used on other wing construction, or types, but with modifications, since these methods assume the easily cut skins of HLG wings. I will address three methods:

A) Tape hinged

B) Skin hinged

C) Carbon skin hinged

First, let's address some tools. You need a good straight edge. The typical 36" x 1" metal ruler stinks. It is too thin, too flexible, and too narrow to hold firmly without exerting lots of pressure. I prefer the 48" x 2.5" version of a metal ruler. The one I have is made of aluminum, and is about twice as thick as the typical 36" version. I glued some 1/16" thick rubber to the entire back side of mine, but that is not necessary.

The next tool is one that any builder should own: a roll of non-slip shelf liner. It comes in a roll, and looks like someone dipped some open weave screen into liquid foam. The beauty of this stuff is that anything placed on it will not slip around at all. For example, if you lay a 1" wide strip onto a wing bed, then place the wing on that bed; it will not move around when installing servos, sanding the edges, or cutting out an aileron. This is the stuff you will be placing under the metal ruler to hold it in place when cutting out the ailerons. It can be seen in pictures #1 and #2

The final tool is one you will make from a single edge razor blade. We will refer to it later as the blade tool. Making this tool takes some 400 grit wet/dry sanding paper and a single edge razor blade. Holding the edge of the blade up at a comfortable angle (and remember that angle), drag the blade across the 400 grit until you have well rounded one corner. (See picture #1.) The goal here is to make a blade that has a dull flat spot on one corner that you can drag across the skin of the wing without cutting it. You can test the blade by dragging it over some paper; it should not be able to cut the paper when held at that same angle. Do not dull the rest of the cutting edge.

Tape Hinged Ailerons/Flaps

The first method, tape hinge, is essentially when you cut out the aileron, make a clearance bevel, then tape the aileron back into place, letting the tape act as a hinge. BUT! If you have ever done this on a HLG, you know that it is easy to ruin the aileron once removed. It is easy to ruin the shape of the hinge line when sanding the bevel. In the method described here, you never completely remove the aileron. This makes for a warp-less aileron installation, with no "memory" built into the hinge. Clearance is made by removing foam from a channel instead of sanding a bevel.

The steps I use are as follows:

1) Set the wing in the top beds, so the lower surface is up. Mark out the aileron corners (or one corner, if you are using a triangle tapered aileron) on the bottom of the wing. I just put a dot there.

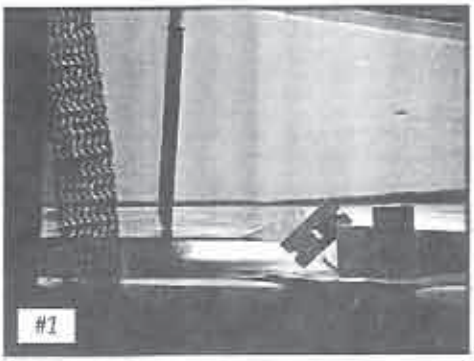
2) Lay a 1" non-slip strip of the material described above on the bottom of the wing, with the edge of the strip about 2/3 the width of your straight edge away from the hinge line, towards the leading edge. Then lay the straight edge so it lines up with the hinge line. The straight edge should be sitting so that only the edge you will cut against is against the wing surface (picture #2). The opposite side is held up by the strip of non-slip. If your straight edge has some weight to it, it should be hard to move around. Once you apply gentle pressure to it, it should remain in place to allow for accurate cuts.

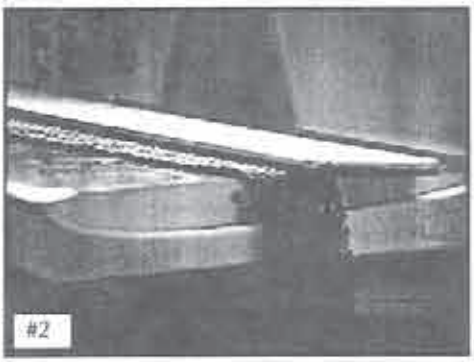
3) Using a regular, single edge razor blade, cut completely through the wing. I try to do this with one stroke. The ends usually do not make it all the way through, so clean them up with a light touch. I use an Exacto blade to make the vertical ends of the cuts (picture #1).

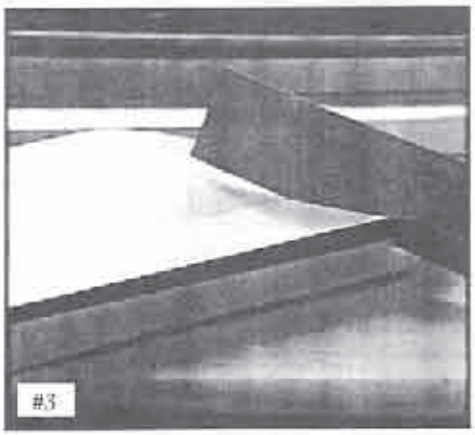
4) Now comes the key to this method. Flip the wing over (laying it on the bottom bed), and run a thumbnail lightly over the cut to smooth out the fuzzies. Now apply your hinge tape, cutting the ends even with the ends of the ailerons. This means that you have hinged the ailerons before cutting it completely free. It should be very easy to get it aligned perfectly.

5) Flip the wing back over, in the top bed, and dig out the "blade tool". Decide how much clearance it will take for full down aileron (or flap). It will not be much. I use 1/8" at the root of a 2" wide aileron; this gives 45 degrees of down motion in a thin airfoil HLG wing. Make marks to locate the cut, since the straight edge will cover the previous cut (meaning that this cut will be on the aileron, slightly aft of the hinge line). Taper the width based on the chord of the aileron. If the aileron tapers to only 1/2" at the tip, it takes almost no width to get clearance. This cut will define the aft edge of the foam and lower skin strip to be removed to allow downward movement of the aileron. You will be removing the foam and thin strip of skin.

6) This is the delicate part. You will be cutting through the lower skin, and foam, but NOT the upper skin. The blade tool should be held so that the part you rounded off will contact the upper skin, but the sharp edge will


#1


#2


#3


#4

come in contact with the foam, and lower skin. You will have to use the sharp corner to start the cut, then use the dull side when making the full length cut. Be sensitive with your hand, and you can feel when the cut gets down to the upper surface. Don't push on that skin! Be sure to cut the lower skin (the skin facing up) full length with the first pass; then you can make more cuts to get through the foam.

Flip the wing again, and use a razor saw to make the chord cuts to free the ailerons. They should now have free movement upward (picture #3).

8) Flipping the wing again, use a dull screwdriver or something similar to gently gouge out the foam channel (picture #4). Another method for this is to flex the aileron up 90 degrees, and use a blade to cut the foam in the channel free.

9) Done.

Skin Hinged Ailerons/Flaps

I use the same method as above, except both cuts are like the second cut (step 6), meaning that they both use the blade tool, and neither cuts the top skin. A good tip on preventing the top skin from tearing at the aileron corners, is to drill a 1/8" hole at the forward corner of the chordwise cut. The width of the channel of foam you remove is determined by the flexibility of the upper skin. If the skins are thin, say 2 ounces total glass cloth, a channel of removed foam about 3/16" wide should suffice. If the wing is bagged with a strip of Kevlar™ to act as the hinge, modify as follows:

Make the two cuts that define the channel of lower skin and foam to be removed centered around the desired hinge line. Once the channel is removed, score the Kevlar™, top and bottom, to define the hinge location. I use a dull blade (like the tool above) to try to break the epoxy matrix, without cutting the Kevlar™ fibers. I have successfully used 1/2 oz. Kevlar™ mat as a hinge material for HLG wings. In cases with glass, above or below the Kevlar™, you usually need to score it to allow free movement.

Carbon Skin Hinged Ailerons

Use the same method as above, with modifications. The issue here is that carbon is very stiff, and does not like to flex. For example, most of my HLG wings are laid up as follows: 3/4 ounce glass cloth, full span, then another layer 2/3 span, then 1/3 span (or thereabouts - each partial layer is cut at an angle). Next, a full span layer of 1/3 ounce carbon mat. The carbon mat adds so much stiffness that a living hinge does not work. At least, it did not work unless I cut a channel almost 3/8" wide. If the channel was less than that at the root, it took 4.8 ounces of torque to get full deflection. That would kill batteries rather fast. The solution was to cut a narrow channel, as in the glass skin hinged method, then make a hot wire tool to burn a channel of foam at the top skin that allowed the flex of the aileron to take place over 3/8". The channel of foam removed is a T, with the top of the T touching the upper skin of the wing. On my first attempt, I stuck a modeler's T pin (the thick wire type) into a block of wood, then heated it with a torch. I would insert it at the hinge line, then drag it along the skin cutout to melt a channel of foam. It worked for me, but it left small bubbles from too much heat on the upper surface. The next attempt, I burned the foam out slower, with much better results. (But then again, the plane with the bubbles won the TNT HLG contest in 1997. Go figure...) ■

Fred Mallett hamming it up at the IHLGF in 1997. Photo courtesy of Fred Mallett.

SAILPLANES UNLIMITED, LTD.

IN STOCK

Krause

1/3.5	Discus	HQ2.5/12	158" (4m)
1/3	Salto	HQ3/14	179" (4.53m)

Roedelmodell

1/4.5	ASK 21	E393	165" (4.2m)
1/3.8	Ka6E	E392	165" (4.2m)
1/3.75	Fox	RG12	149" (3.77m)

PriBeck

1/3	ASW27	HQ2.5/12	196" (5m)
1/2.7	ASK18	E203-201-193	209" (5.53m)
1/3	Ka6E	E207-205-205	196" (5m)
1/2.7	ASW19	Ritz3 mod.	212" (5.4m)

Schueler & Fleckstein

1/3 all glass	ASW24	E205	196" (5m)

Bruckmann

1/3	Salto	Ritz 2	176-203" (4.5-5.2m)
1/3.8	ASK 18	E 205	165" (4.2m)
1/3	Fox	E 374 SD 6060-6062	183" (4.66m)

Czech these out!

All completely finished with retracts installed:

1/3 all glass Ventus 2C	HQ 3/15, 13, 12, 10, 8	257" (6m)
1/4.75 all glass ASW 27	HQ 3/12	158" (4m)

And more

TOWPLANES in stock

Frisch: 1/4 Wilga 109" (2,78m)
Bruckmann: 1/4 Piper Pawnee
Roedelmodell: 1/4 Jodel Robin 86" (2.18m)

SPECIAL ORDER

PriBek

1/3	ASW24	E203-201-193	196" (5m)
1/2	ASW27	HQ2.5/15	294" (7.5m)
1/3	Fox	E374	183" (4.66m)

Bruckmann

1/2.5	Fox	222" (5.65m)

Frisch

1/3	Wilga	147" (3.73m)

Schueler & Fleckstein

1/3 all glass	Fox	RG12	183" (4.66m)
1/3 all glass	ASH 26	HQ3/14-10	235" (6m)
1/2.8 all glass	ASW15B	HQ3/14	235" (6m)

very realistic **PILOTS** from 1/4 to 1/2.5

For Price Information, Scale flying news, Message board, Classified and much more...Visit our website @ **http://www.sailplanes.com**

Sailplanes Unlimited, Ltd. 63 East 82nd Street, NYC, NY 10028 Phone: (212) 879-1634 Fax: (212) 535-5295

TMSS UNLIMITED ESL SOARING CONTEST

Dates: Saturday July 17th and Sunday July 18th, 1999.

Site: Fort Lee Drop Zone, near Petersburg, Virginia.

Pilots meeting: 9:00 am, first launch at 9:30 am both days.

C.D.: Josh Glaab, (alternate C.D. Doug Barry).

Task: International duration (T1), with times to be specified based on prevailing conditions at the pilots meeting, combined with a NATS-style 100 point graduated runway (L6) spot landing. Expect an open winch flying sequence format if conditions permit. No rounds will start after 3:30 pm on Saturday or 2:30 pm on Sunday.

Registration: $15.00 per day, only 2 competitors per frequency! Please register early and/or be prepared to switch frequencies.

Launching Equip: ESL (or equivalent) 12 Volt winches with electric retrievers.

Amenities: A Greg Blazey Food-feast will be provided, for a nominal charge, facilities will also include a Porta-John.

No Fly Zone: Since there is a Bald Eagle nest in the area, there will be a no-fly zone imposed. Approximate no-fly zone dimensions are 90 degrees arc-sector starting 0.5 miles from launch/landing zone located to the south east.

Hotel Information:
There are many hotels just minutes from the site:
1) Days Inn, Hopewell Va., 4911 Oaklawn Blvd., 1(800)458-1500 or (804)458-1500

2) Comfort Inn, Hopewell Va., 5380 Oaklawn Blvd., 1(800)228-5150

Downtown Richmond area - (app. 25 minutes, completely civilized except during Harley Davidson conventions)
3) The Omni-Richmond. Many quality restaurants and the Richbrau Micro-Brewery are within easy walking distance. Phone# 1-(800) 843-6664
Directions: To the Flying Field - Take I-95 from the north or south:
To the I-295 beltway around Richmond on the east side. Use Exit 9B to Rte.36 West (Washington Street) towards Petersburg. At the third light, turn right on Rte 144 (Temple Ave). At the next light turn right on Rte. 725 (River Road) and follow 1.8 miles to McLaney Drop Zone on the right.
OR
To the Rte. 54 exit to Colonial Heights. At the first light turn right on Rte. 144 (Temple Ave). Follow for 3.2 miles to the 5th light. Turn left on Rte. 725 (River Road) and follow 1.8 miles to McLaney Drop Zone on the right.

----------detach here and mail ASAP----------

Name: _____ Phone# _____

Address: _____

Primary R/C Channel# _____ Alternate R/C Channel# _____

AMA# _____ Sportsman or Expert: _____

Please return entry form along with check payable to TMSS to: Josh Glaab, 161 Alaric Drive, Hampton VA, 23664. Phone# (757)850-3971, or (757)864-1159 during the day, e-mail ljglaab@pinn.net.

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.

"Falkenhorst, The Scheibe Aircraft Story"
By Gerd Zipper
ISBN 3-7059-0059-5
Weishaupt Verlag, Austria
Large hardbound format, 176 pages, German language.

Schempp-Hirth, Schleicher and Scheibe are considered to be the Ford, GM and Chrysler of the sailplane industry. The Schempp-Hirth story was told by Peter Selinger in his book "Segelflugzeuge" in 1985, and "Rhönsegler", Richard Ferriere's Schleicher story, was published in France, followed by a German version by Selinger in 1987. Now at last, after Egon Scheibe passed away at the age of 89, the Scheibe story is available as well. The author was able to interview Mr. Scheibe before he died in 1997, thus a lot of first hand information could be included in the book.

Scheibe is probably the only major aircraft manufacturer that still builds aircraft the old fashioned way; steel tube fuselage and wooden wings, all fabric covered. Their "Falke" series motorglider first came out in 1962. Still in production, it is the most popular motorglider in the world with over 1200 sold.

Scheibe's design philosophy is in many respects similar to that of the Schweizers, where some sleekness and performance is sacrificed to obtain a strong and easy to service aircraft with excellent protection for the occupants. The company ventured into the world of glass briefly in the early eighties with a small series of fiberglass trainers known as the SF-34, followed by the SF-36 motorglider, which used many of the sailplane's components. After a few years the molds were sold to foreign manufacturers who continue to build the aircraft with their own designation. "We will build composite aircraft when it can be done more efficiently than what we are doing now," said Egon Scheibe.

Due to the problems with product liability and litigation lawyers, no Scheibe dealership exists in the US, but several gliders of the types "Bergfalke" and the "Spatz" series have been imported by individuals along with a few samples of other types. These along with every other sailplane, motorglider, airplane and ultralight that Scheibe ever built are thoroughly described in the book, each with photos and three views. There are 76 color photos covering each model, and 154 B/W illustrations which should make this book popular with anyone interested in gliding history. Scheibe aircraft owners and scale model builders will find a lot of useful information in it even if they do not read German.

"Falkenhorst" (Falcon's Nest) can be ordered from Jan Scott, 12582 Lutheran Church Rd., Lovettsville, VA 20180; <flycow@ibm.net>. $60 + 3 S&H, check or money order only. ■

Airfoil Plotting Programs for Windows
...from Chuck Anderson

Chuck Anderson has released Airfoil Plot 8 and Model Design 8 plotting programs for Windows 95, Windows 98, and Windows NT. These programs are upgrades to Airfoil Plot and Model Design DOS programs used by modelers for 15 years. Airfoil Plot 7 and Model Design 7 remain available for those requiring plot programs for computers running MS-DOS and Windows 3.1. operating systems.

Both programs have over 400 airfoils and can use airfoils from Michael Selig's UIUC data base. They also have built-in airfoil generators for plotting NACA 4-digit, NACA 5-digit, and Quabeck airfoils. A utility program is included for entering and editing data files and to change camber, change thickness, or combine airfoils. Model Design 8 adds the ability to plot plans for wings with up to 5 panels as well as angle templates, circles, and ellipses. Both airfoils and wing plans can be exported as DXF files for use with CAD programs.

Airfoil Plot 8 and Model Design 8 are complete and do not require additional modules. Prices also remain unchanged at $35 for Airfoil Plot 8 and $50 for Model Design 8. Upgrades for users of earlier versions are still $15. Shipping and handling is $5. Send a stamped, self addressed envelope for additional information. Chuck Anderson, P.O. Box 305, Tullahoma, TN 37388; (931) 455-6430, e-mail <canders@edge.net>. ■

Bruckmann 1/4 Scale Piper Pawnee
...from Sailplanes Unlimited, Ltd.

Specifications	
Fuselage:	Kevlar foam, glass sandwich with reinforcing in the forward bottom area. Rivets and panel lines are molded in.
Cowl:	Glass with panel lines
Horner wing tips:	Gel coated glass
Outer canopy frame:	Gel coated glass with window lines molded in.
Inner structural canopy frame:	Hollow molded glass
Wing fairings:	Gel coated glass with panel lines
Canopy:	Clear PVC one piece
Wings:	Foam glass Obechi

The Bruckmann 1/4 Scale Piper Pawnee has very high quality components, but assumes competent building skills. The kit gives the builder the option and freedom to make certain personal choices regarding control surface hook up and includes no hardware for hinging, flying wires, or servo installation or placement (except for the wings). The hardware for mounting the wings and stab to the fuselage is included.

Here's what you will need to do to build it:

Drill holes where marked for wing joiner and glue the center joiner into fuselage. The wings come with ailerons and flaps cut out, servo boxes routed, wing tube receptor installed, servo wire channels, and rear alignment tube in place. The end plate on the wing root needs to be aligned and glued on, and the fiberglass wing forward fairings glued to this. The wings have the dihedral angle pre cut, and the center joiner has the dihedral built in.

The stabs and rudder are built of very light balsa ribs and sheeting and ready to mount. The joiner tubes are installed in the stab. You will need to drill the holes in the fuse where marked and add the enclosed tubes and rods with suitable reinforcing. The supplied rudder post has to be cut out and glued in after. Flying wires for the stab are required (not supplied), but hard points are in the stabs.

The landing gear requires careful layout, but parts are included for a workable scale gear.

The supplied firewall needs to be glued in, as well as the gear mount plate. The canopy frame, windows, and outer frame are one of the nicest parts of the kit; all fit very well. The windows need to be cut out of outer frame and the unit assembled.

Scale wing struts are included, molded from foam and glass. The builder will decide how to mount these to suit his personal preference; no hardware is included for this. There are hard points in the wings for anchoring the struts. The struts are not functional, but really add to the scale appearance of the Pawnee.

The motor installation is left up to the builder/pilot. 70 to 100cc motors are appropriate. The builder will also have to check the wing stab incidence. All the specs are supplied.

All the fiberglass work is excellent. The Kevlar fuselage is a work of art in itself. All fiberglass components are gelcoated white except inner canopy frame.

Sailplanes Unlimited, Ltd., 63 East 82nd St., NYC, NY 10028; (212) 879-1634, <http://www.sailplanes.com>.

■

SLOPE RACE!
SLOPE COMBAT

May 14-16, 1999

Wilson Reservoir
Russell County, KS

Contact: Paul Wright
(402) 796-2175
paulw@isco.com

Sponsored by:

L.A.S.S
Lincoln Area Soaring Society

4TH ANNUAL

G.N.A.T.S. AEROTOW '99

"Come fly with us in Canada's beautiful Niagara Wine Country!"

August 13 - 15, 1999

To be held near Winger, Ontario, Canada
(Approx. 30 Miles West of Buffalo/Ft. Erie)

Co-sponsor: Canadian Model Aerotow Society

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/ ailerons 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

---

BALTIMORE AREA SOARING SOCIETY PRESENTS...

THE EAST COAST HAND LAUNCH CLASSIC

May 15-16, 1999

(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

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 — Long Island, NY
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 Bentley, Duane.Bentley@ae.ge.com
(513) 777-5491

May 29-30
ESL/F3B — Pine Island, NY
Mike Lachowski, mikel@eclipse.net

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, lsfpres@aol.com, (219) 485-1145
Mike Remus, (219) 485-6453

June 5-6
CASA-2M (Thompson Field) — Warrenton, VA
Rodney Armistead, roda@msn.com

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 Shape, (937) 843-5085

July 3-4
ESL/LISF Hosted USA F3J — Long Island, NY
Team Selection Competition
Fritz Bien, fritz@spectral.com

July 17-18
TMSS Open — Richmond, VA
Josh Glaab, (757) 850-3971
ljglaab@pinn.net

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
Blanco II, The Pilgrimage — Cape Blanco, OR
Mike Shaw, (541) 269-2423
grizzy2@gte.net

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 1-3
Great Midwest Oc-TOW-berfest — St. Louis, MO
Scale Aerotow
Pete George, (314) 664-6613
twometer@worldnet.att.net

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. LJM 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.

Hand Launch kits for sale, NIB, large selection, great prices. Tom Gressman, (303) 979-8073, after 7:00 p.m., MST, Colorado.

JR XP 783 FM w/507 servos. Channels available: 41, 42, 43, 44, 45, & 47. $250 each plus S&H. Will be selling 3 of these systems, take your pick of channels. Avocet Altimeter watch... $125.00. Steve Shibuya, (307) 733-7665, <s2@teton1.k12.wy.us>, Wyoming.

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, slope sites 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/~varsanfo/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 Keisling (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, jjglaab@pinn.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, FL 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, 5830 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, (402) 483-7596, jcbaker@inebraska.com, <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, <jimbonce@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 - Bay Area R/C Fliers, Mike Shaw, <grizzy2@gte.net, (541) 269-2423.

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/>.

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, Voicemail (412) 560-8922, <ydne3la@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)934-3815.

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

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

England (CIAM Flyer), Jack Sile (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@osk.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 student(s 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), "AJ" 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

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

Advertiser Index

Subscription Costs

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

Back Issue Cost

Back issues are available for the current year. All are mailed via first class or airmail.
U.S.A., Canada, Mexico: $2.50 Per Issue + Tax (Texas Only: 7.25%)
United Kingdom/Europe: $3.75 Per Issue
Asia/Africa/Middle East: $4.35 Per Issue

❑ Please renew my current subscription.
❑ Please enter my new subscription to *RCSD*.
❑ Please send the back issues I have selected.

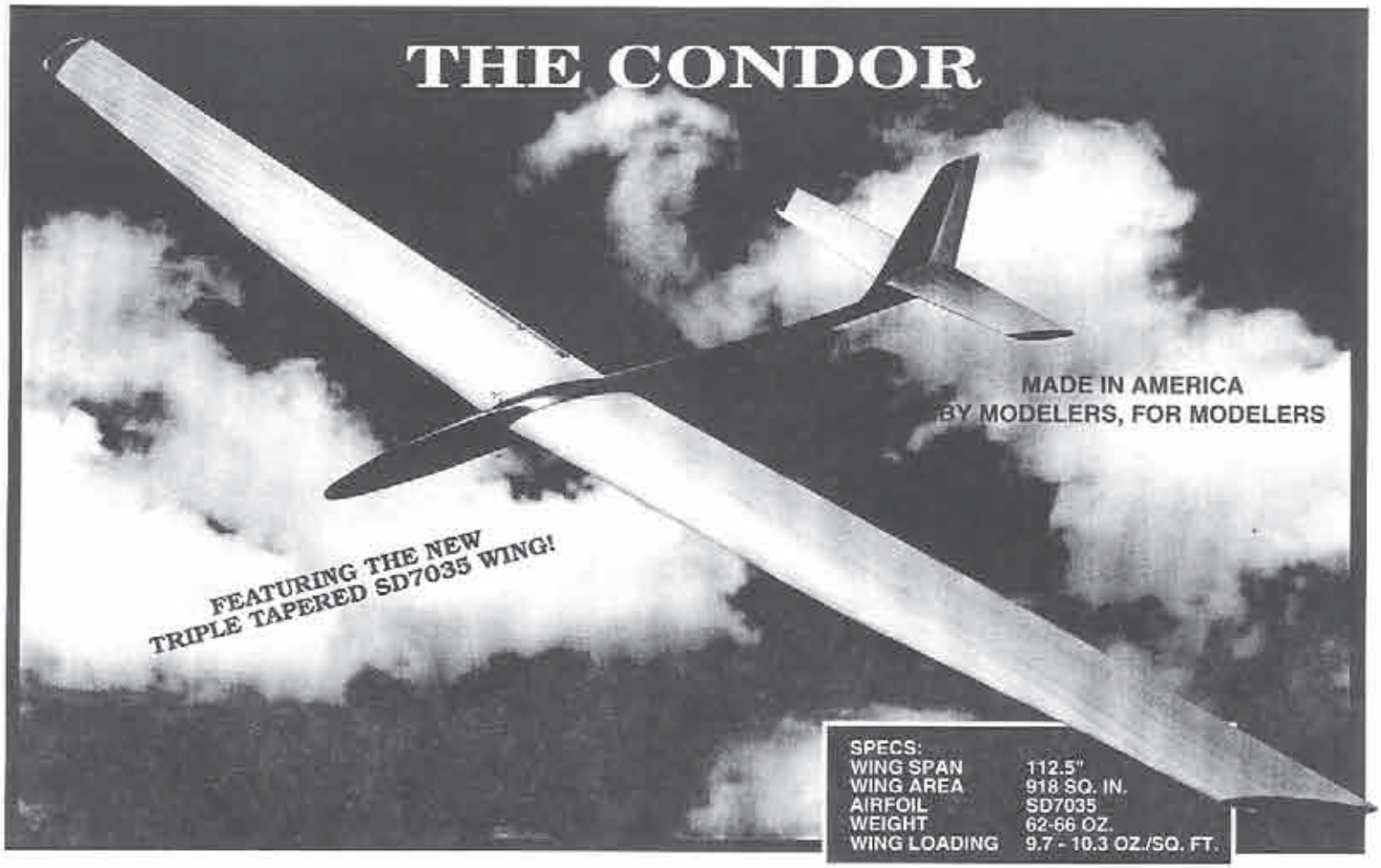
(Check or Money Order, only, please U.S. funds.)

Name_____

Address_____

Please return to R/C Soaring Digest,
P.O. Box 2108, Wylie, TX 75098-2108

THE CONDOR



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 obeche 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 ★

SLEGERS INTERNATIONAL

P.O. Box 364, Long Valley, NJ 07853
Shipping: 35 Hacklebarney Rd., Long Valley, NJ 07853

(908) 879-9964 - FAX (908) 879-8177
http://www.slegers.com