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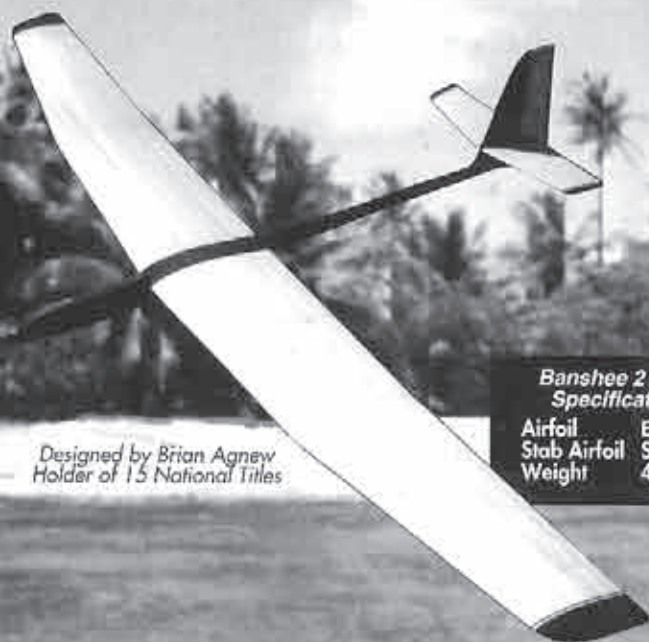
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R/C SOARING DIGEST

A Publication for the
R/C Sailplane Enthusiast!



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LOS BANOS '97

Dave Wenzlick's ASK 21, with 35 mm camera, passes overhead at the Los Banos 4th Annual Slope Scale Soar-In. Event coverage by Joe Chovan starting page 8.



Photography by Joe Chovan.

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The Soaring Site

A Wonderful Sailplane Summer!

Wish we could attend all the wonderful event happenings that are scheduled for later in the year; some, of course, have already become memories for those fortunate to have been able to attend!

Wherever sailplaners get together, there's always sure to be things to see, and old friends to chew the fat with, whether it's about family, friends, or the latest in sailplane design or gossip. The Los Banos event in California was no exception, and Joe Chovan of New York made the trip in anticipation of just that: having fun, Los Banos style. Elmira '97 and the Mid-South Soaring Championships (MSSC) have also come and gone. Even mud and unseasonable rains did not deter most MSSC folks from their shot at having a wonderful sailplane summer.

Just what is it that creates a "signature event" for sailplane enthusiasts? Well, as reporter Joe Chovan so aptly put it, "It's the people that make the event and, no matter how the wind blows, you always leave a little wiser, and a few friends richer..."

Well said, Joe. And, we hope that all the upcoming events for all of you sailplane enthusiasts are rip roaring, good times!

Happy July 4th, wherever you may be!

Happy Flying!
Judy & Jerry Slates



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A Division of the Soaring Society of America



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

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

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Lovettsville, VA 22080
<http://www.iac.net/~feguy/VSA>



Jer's Workbench

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A Step Back in Time

For the last couple of months, I have read, in several club newsletters, that there is a movement to bring back vintage type gliders. Some folks are flying gliders that were kitted before 1979; others are scratch building three function, control type gliders, using elevator, rudder, spoilers, with a polyhedral wing.

I remember when I first started flying gliders, back in the 60's. Glider flying was really fun. Most glider flyers used only two controls: elevator and rudder. The master builders, or hot shot contest flyers, also employed spoilers. As for myself, I built 4 or maybe 5 gliders, before I stepped up to "high tech" flying, which meant the use of spoilers, of course.

Those of you that started flying gliders, during the last 15 - 20 years, have all kinds of neat stuff that we didn't have back in the early days. Back then, there was no Kevlar™, carbon fiber, or computer radios. For airfoils, only a few were published, such as the Clark-Y, E-374, E-387, and E-392. There were others, of course, but I can't remember everything that was available.

So, remembering back to all the fun times, I thought that I would take a step back in time and build myself a two channel, polyhedral type glider. I found an old drawing in the bottom of a long forgotten box; it was yellow with age, and tore easily as I tried to carefully unfold it. But, it was exactly what I had hoped to find.

Building a 2 Channel Polyhedral Glider Part I

Using some of the neat stuff available today, I decided to reinforce the fiberglass fuselage with Kevlar™; the built-up wing to be replaced with an obechi sheeted foam core. The original airfoil, which is a good airfoil except it is thin with a flat bottom, will be replaced with an E-178. Having used the E-178 on several models in the past, I find that it works good for me.

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Root end of wing spar. 4 oz. fiberglass on each side, and carbon fiber on the bottom. Note Kevlar™ thread wrapped on root end of the spar.



4 inch by 1/8 inch hole cut from top to bottom of spar. This is the polyhedral break, which we'll talk about later on.



E178 foam core.



Cuts in foam core for wing spar.



Foam has been removed from wing core for spar.

Rudder and stabilizer are built off the original drawing, and are about the only things that I have not changed.

Finding an old fuselage mold that matched the drawing, an epoxy fiberglass fuselage was layed up in the normal manner, using Kevlar™ for reinforcement. Since the mold required a different airfoil than the one that I had chosen, a new root rib was required.

The next step was to cut a set of cores. Once cut, a set of wing spars, the most consuming part of building a model, was next. The length of the spar was a given, but I wasn't sure what the proper height should be. So, measurements were taken off the foam core, which enabled me to ascertain the correct height of the spar.

The spar was constructed from a sheet of 3/8" hard balsa. A notch was cut, at the root end of the spar, for the wing rod tube, which was then epoxied in place. Measuring from the root to the center of the polyhedral break, a hole (1/8" wide by 4" long) was cut from the top to the bottom of the spar. Next, 4 oz. S-fiberglass was epoxied to each side of the spar. Once cured, the rough edges were sanded off. For added structural strength, a strip of carbon (.007" by 3/8") was added to the bottom of each spar. In the last step, the root end of the spar was capped with some Kevlar™ thread.

Building the Wing

A 3/8" section of foam was cut and removed from the wing core. Then, the spar was epoxied to the back half of the wing core; once cured, the front half of the foam wing cores were epoxied to the spar. Next, a plywood root rib and a balsa wing tip were added. Now, I was ready to apply the obechi wing skins.

Applying Obechi Wing Skins

Cut to the correct size, the obechi wing skins were laid out on the workbench. These skins, being thin and porous, required a coat of clear polyurethane, so that the epoxy would not soak through. Once the coat had dried, a mixture of epoxy and cabosil was applied, using a squeegee, to the insides of the wing skins.

At this stage, the bottom side of the



Spar glued to back half of foam core.



Front half of foam core glued to spar.



Root rib and wing tip added to foam core.



Obechi wing skins.



Wing in vacuum bag



Iron bars are used to insure a nice, straight trailing edge.

foam wing core was **very carefully** placed onto the bottom skin; the top wing skin was placed onto the foam wing core. Using masking tape, everything was taped together, so that the wing could be lifted, and placed into the vacuum bag.

Turning on the vacuum pump, once assured that everything was properly aligned, iron bars were placed on the trailing edge of the wing, insuring a nice, straight trailing edge. The wing was left to cure over night.

Next Month

Next month, I'll trim the wing, add bass wood leading edges and polyhedral. ■

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Los Banos '97

Photography & Story by Joe Chovan
North Syracuse, New York
(Aerial Photography by Dave Wenzlick)

An aerial view of Los Banos taken by Dave Wenzlick's ASK 21 sporting 35 mm camera. Dave Wenzlick photo.

Sometimes, you just can't get enough of a good thing. Having attended last year's event, I had high expectations for the Fourth Annual Los Banos Slope Scale Soar-In. This year, we congregated May 16-18, and attendance was greater than last year's, with 58 registered pilots, plus even more helpers and spectators. All came to partake in the parade and pageantry that has become a signature event for the scale glider enthusiast.

The Site

The actual flying is done above the faces of some very steep hills overlooking the Los Banos Reservoir. There are hills for flying several wind directions, but the weekend's itinerary mandated that flying occur only at the near corner ledges, to facilitate easier frequency control, parking and communication to participants. Despite a less than ideal wind direction for the chosen location, plenty of flying was afforded. There were very few accidents this year, so the system appears to have worked well.

The Weather

As with any outdoor event, a hope for a good forecast was on everyone's mind. I arrived on the Thursday prior to the festivities, and was greeted with increasing winds that afternoon, so I grabbed my fill of the evening's flying opportunities, hoping I wouldn't have to say to weekend arrivals, "Gee, you should have been here yesterday..."

The forecast for the area was HOT — in the nineties! I've heard it said that when it's hot at Los Banos, it doesn't blow, so if there wasn't any wind, it sure was going to be test of character up on those dusty treeless hills. I knew from previous experience, that folks who travel hundreds (or thousands) of miles to fly and see gliders are not lacking in character!



Mickey Crawley's P-51 Mustang entering a pylon-type turn. Mickey is fast, turning, very skilled flier.

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Opening Ceremonies

On Friday, opening ceremonies were kicked off with an exciting low altitude fly-by from a French "Fulga" 175 Magister jet trainer! Paul Grieshaber, the man in the cockpit of the sleek machine, wowed the crowd as he descended from the heavens, and streaked close enough to feel slope lift on his wings. With smoke trailing, he carved two passes over inspired gazers, then left the sky to us. It was going to be a great weekend, I knew.

Lynsel Miller was again the CD, and was capably assisted by Sean Sharif. The flying was broken into 3 groups, as was the "pilot's choice" contest for best plane: modern scale, vintage scale, and power slope scale (PSS). Several sessions of each category were flown each day, with breaks of winch launching, bungee launching, or aero-towing during periods of low lift.

Advertisement for this year's event noted it was to be for scale aircraft only, with a loose 15 percent deviation from scale outline allowed. In keeping with this spirit, most flyers cooperated, although some brought and flew non-scale planes at



Dave Sanders pilots his Schweizer 126 in light slope lift.



Lynsel Miller's TG 3. Model is 12 years old, and built from AMA plans. A Jack Hiner design.



Full Scale French "Fulga" 175 Magister. Paul Grieshaber mans the machine.

times. This was officially "discouraged" during the scheduled flying sessions. Nevertheless, fun was in the air, despite what else may have been.

Saturday provided the best winds of the 3 days, with lift cycling in moderate amounts more than generous enough for the large, modern scale ships. A few flyers got into trouble when the lift apparently "quit", and they were unlucky enough to be without altitude, but those skilled in the wiles of inland slopes knew to search out beyond the ridge to find large thermals breaking loose. It was strange to this coastal flyer to see so many planes far out from the ridge, over water, searching for lift!

Sunday's wind was much lighter in the early afternoon, and aero-towing was the word for action. This year, two tow pilots were available to get folks airborne. Dick Miller, last year's designated tow pilot, again flew his red UPF-7 Biipe, with the hefty 3.2 Sachs providing more than enough power for even the larger gliders. Dick was joined by Jerry Arana, and his Fly Baby Biipe. Zenoah



Mickey Lewis's P-51 Mustang gets a healthy heave. Mickey is a native of Los Banos. Lucky Mickey! Joe Chovan photo.

An aerial view of Los Banos taken by Dave Wenzlick's ASK 21 sporting 35 mm camera. Dave Wenzlick photo.

C-45 powered.

With few exceptions, the towing went smoothly, and many enjoyed a break from the confines of the ridge or winch line.

Awards

Awards were presented on Saturday to 3 outstanding builders, following a difficult session of voting. Chris Pratt got top honors for his Yellow Aircraft Mk XIV Spitfire in the PSS category. The beautiful model weighed 20 lbs, and unfortunately didn't fly due to lack of lift. Gary Brokaw took best in vintage scale with his Austria "Elephant", a memorable return following last year's appearance of this gentle giant. Best modern scale was earned by Mike Reagan, with his ORFA ASW 27. This was a beautiful large model, and Mike made a miniature scale glider trailer (actually also quite large) to transport it! Mike is quite the innovator.

Good Company

Los Banos has consistently attracted the best talents and personalities in the hobby, and this year I had the pleasure of meeting many.

Steve Willcox, and Dave Wenzlick, from Phoenix, Arizona had a variety of weapons in their quiver. Dave's most amazing plane this year was his tiny 1/16th scale ASK 21. This 39 inch span, 8.25-oz. model has wingeron control, and astonished everyone with its ability to slice about, and then roll so

fast, the wings would disappear! Dave plans to kit the model in the future, but wishes to work some more details on prefabrication options to give a high quality product. Dave brought a big brother to the tiny ASK 21, a much larger model, but with identical markings, carrying a 35 mm camera in the cockpit! Mark Mech, also from Arizona has acquired production of the foam/coroplast F-15 designed by Dave Wenzlick, and is now offering an EPP Corsair, which made a Los Banos debut three times over. These authentic looking fighters were "beta tested" by Steve and Dave. Mark is an innovative entrepreneur, and openly shares his knowledge of airplane construction, as do all the truly great designers. His "Aerofoam" Corsair is one of the few gull winged fighters expressly offered for the slope, and exhibits the resilient virtues of foamie technology, whether one's testbed is combat, or unfriendly landing zones. The "corsair trio" of Steve, Dave and Mark flew combat and formation bungee launches. It's not often one sees a Corsair at the slope, and three are certainly rare! A great showing by the boys from Arizona!

Gary Brokaw never fails to entertain. A versatile pilot, Gary could be seen aerotowing his behemoth "Elephant" one moment, and bungee launching his "Slope Scale" Zero the next. Covering all bases, Gary would then throw his 1/4.4 scale Discus to the delight of the crowd. An incredible builder and skilled pilot, Gary will offer invaluable tips with a smile to

any curious neophyte.

One of the few father/son teams present this year, John Raley and son Cullen, came from Costa Mesa, California. Their enthusiasm was infectious, and inspiring, as Cullen helped dad ready their large bird for aero-tow. A PWS 101 from Martin Simons' plans, it's a 1938 Polish design, and flew slowly and gracefully. It's nice to see the hobby passed from one generation to the next. John has amassed quite a plethora of skills in this hobby, but has a special affection for the vintage gliders. Next year, will we see John assisting Cullen with a project of his own?

Stan Sadorf brought his Salto, with Viking fuse, and somewhat non-scale wings adorned with "Sky Shine" mylar. It was fun to see a Salto's leading edges blink blue and green as he negotiated the varying lift. Stan flies with the Inland Soaring Society in Riverside, California.

What if you break a wing rod, or your servo mount needs some attention? Two vendors were on hand especially equipped to tempt the soaring enthusiast. Bruce Devisser, with "Unbeaten Path imports" (Ockham Hobby Marketing

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Brian Laird's Multiplex DG 600 over Los Banos Reservoir. Brian is a highly skilled and versatile pilot. He's better known as "Mr. Slope Scale".



Hal Kramer holds model of French "Fulgo" 175 Magister. Model is replica of jet, which made full scale fly by.

Services), manned a tent right next to the frequency impound, with open kit boxes, and other enticements. Paul Trist of "Planes, Wings and Things" had a booth displaying his goodies for the silent flyer, including licorice sticks! Perhaps next year, someone will bring ice cream?

Robin Lehman arrived from the New York City area on Friday to lend his extensive expertise — especially in the area of aerotowing. I saw Robin skillfully help Sheldon Cohen with his Roke 4.2 M ASK 18's first flight. It's calming to watch a master at work, and you know a plane is in good hands with Robin at the sticks.

One of the men who helped to spearhead foamie construction movement, supplying kits that bring forgiveness and maneuverability to the scale glider enthusiast, Dave Sanders brought several of his creations, including a giant Schweyer "Rhonsperber" gull winged bird. It had to be among the most unique of the vintage craft, and made of EPP

foam, no less! Flying with the transmitter casually hanging cupped at his side, thumb on right stick, left hand free, Dave was often seen piloting in the light lift, alongside conventional balsa or fiberglass counterparts. A skilled slope pilot, Dave is also mastering the thermal regime, and bringing EPP to new heights with his designs.

Brian Laird, Carl Maas, and the clan of "Slope Scale" factory flyers of the ISR in Riverside, California, arrived with planes-o-plenty. Once parked, the "bad boys" of Point Fermin (near Los Angeles) spilled their arsenal into formation over a 20 by 50 foot area, wingtip to wingtip, in an impressive display. Nearly all these planes are scratch built replicas of WW II fighters, and one-piece designs. Master craftsmen, and unquestionably skilled in high speed slope aerobatics, Carl and Brian always put on an amazing show. They provide stunning proof of what CAN be done with a well-built and trimmed plane. I've often heard them proclaim if one hopes to excel in this hobby, one needs the discipline, drive and patience to build right, and persistence to acquire stick skills. There just are no

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Mike Reagan's custom built trailer for his ORFA ASW 27. Wheel is moveable for easy hand carting when traveling.



Steve Willcox hungee launches his EPP Acrofoam Corsair — a Mark Mech design.



Dave Wenzlick's Sterling Schwoetzer 126. Model is of built up wood construction.

substitutes for these things.

Mark Navarre, of the Laguna Hills area in California, put on exciting displays of aerobatics with his DAW wood mustang and Thermal Flügel ASK 24. Mark is definitely a multi-talented individual, and didn't hesitate to demonstrate the skills he's acquired to become an accomplished slope racer, and thermal pilot.

"Lucky Locals" Sean Sharif, Mickey Crawley, Charlie MacMurray, Joe Thomas, and John Bassetto hail from the San Francisco Bay area, and made the short trek over the mountain pass, past the San Luis reservoir to join the fun. Perhaps the luckiest is Mickey Lewis, who resides in Los Banos. Mickey brought his "Pilot Models" P-51 Mustang ARF, converted to slope. Mickey says the 6 lb. model needs a 20 mph wind to fly. Mickey also flies gas with the Los Banos R/C flyers.

For me, perhaps most memorable was Saturday evening's PSS "cloud" of planes. Definitely a "target rich environment", to borrow a phrase from a movie; many, small and nimble WW II fighters floated and darted in all directions. Since the lift was somewhat light, and not limited to a

R/C Soaring Digest

narrow lift band close to the ridge, any impacts were of the low energy variety, and pilots usually flew out of the entanglements.

When grown men shout in delight at each frequent in-air contact, issuing good humored threats of bravado with a cluckle, and then laugh even louder when their plane is knocked from the sky — it's a telltale sign that something magic is happening. Call it a rejuvenation, excitement, and of course, provocation, R/C combat is fun, and we caught some of the action that evening, as Messerschmidts, Mustangs, Corsairs, Zeroes, and a few unmentionable (read non scale) craft swooped and climbed, trying to vie for better attacking or defending postures. And when we thought we'd seen it all, Larry Jolly unleashed his tiny e-boosted Me 163, which broke through the action as its rocket powered namesake must have done in the skies of the second World War. With a whir, the little flying wing swooped about, encircling the crowd aloft, and every so often, poked through a cluster of combatants. Leave it to Larry!

July 1997



Gary Brokaw's Slope Scale Zero. Model has hook for bungee launches.



Gary Brokaw's 1/4.4 scale Discus. Graupner fuse, and 5% overscale wings.

I don't think anyone had more fun than Mike Lance, with his EPP bright red Me-163. If Mike wasn't an ace going into combat at the ridge, he definitely emerged one — several times over! Mike is an officer and a gentleman, and I was honored to share the skies with him, and hope to have the pleasure of bumping his "cote" again soon. I don't think I actually won any of the battles that night, but I lived to tell the tale.

They will come...

A good friend once noted the reason one goes to a slope soaring event, isn't necessarily to accumulate air time. Let's face it, the airspace can get more crowded than one sees at the home slope, and unless it's a combat event, that's usually not a pilot's desire! Sharing the experience with those who are, or aspire to become skilled designers, craftsmen, and pilots is the real goal here, and if one attends, it is always attained. You can rub elbows with the experts — they are out there, doing their thing, right alongside you! It's the people that make the event, and no matter how the wind blows, you always leave a little wiser, and a few friends richer... Not a bad deal! ■

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Dennis Weatherly's JackWabbit

This month's column describes a reader's tailless creation. Dennis Weatherly first approached us concerning information on one of the EH sections for a larger tailless design, but his smaller testbed so impressed us we just had to devote a column to it. Here's what Dennis has to say about his latest flying machine...

"First, a big thank you for your web page and for providing a source of information regarding flying wings. I have always been fascinated by them. I've only built one so far (an RCM Little Plank), but that is changing soon.

"A friend has helped me to design a swept wing that I will power with an electric ducted fan system. The proposed model will use an EH 2.0/10.0 airfoil, 14" root chord, 10" tip chord, 72" span and three degrees of twist. Projected weight is about seven pounds. Power will come from a WeMo Tec RK740E fan unit (4.2" diameter) driven by an Aveox 1412/4Y motor on around 28 cells. It should be exciting!

"Since I am a computer driver by trade, I was interested in the program (my friend) used to determine the twist. He pointed me at your web page, where I downloaded the Panknin Twist program. It works fine under QBasic and Windows 95..."

A few days later, Dennis wrote...

"To prove to myself that I could design and fly a 'wing', I shrunk the proposed big jet down to Speed 400 electric size. The resulting model shared the same taper ratio and sweep in a 30" span, 7"

root chord, 5" tip chord and 180 square inch package. I used a stubby box fuselage and a single vertical fin, with the fin LE against the wing TE. Airfoil is the EH 2.0/10.0 with three degrees of twist. Ready to fly weight is 15 ounces.

"Only, I goofed when I cut the cores, and I ended up with 20 degrees of total sweep, rather than 20 degrees per panel. So, it was more like a plank than originally planned. I plugged the numbers into the Panknin Twist program and got a CG of 2.9 inches back at the root, so I started there.

"Rolf Zurcher helped me with control throws and we gave it a toss. It zoomed straight up, rolled uncontrollably as it slowed down and then dove into the tall grass (thank goodness)! Damage was minor and quickly repaired. Rolf figured that the roll problem was adverse yaw due to the low airspeed. We moved the motor battery ahead 0.5" and tried again.

"The second flight was better. I had my hands full trying to fly the plane, find the trim knobs and get some down trim dialed in. It was pretty quick! After about a minute of this, I landed for a breather and to reset the surfaces.

"The trim changes had resulted in the elevons being depressed below the wing TE, so I guess the twist was too much. With the trim dialed in and a fresh charge, we launched for flight number three. Success! The little plane accelerated straight away and flew beautifully. Pitch and roll control is solid and well damped. It tracks through turns like it's on rails. And it is really fast! Most people estimated the airspeed at over 60 m.p.h. flying straight and level. I flew it four more times at the Celebration of Silent Flight.

"A funny thing has happened since I reported my success on the e-flight mailing list; folks are contacting me as if I'm a flying wing "expert"! There are a lot of folks out there that are intrigued with them, but afraid to try for fear of failure. Speed 400 sized models make great experimental tools, since they are so small and cheap.

"It only took a week to design and

R/C Soaring Digest



JackWabbit Dimensions

Wingspan:	30"
Root chord:	7"
Tip chord:	5"
Sweep per panel at quarter chord line:	10 degrees
Wing twist:	3 degrees (which proved to be a bit too much)
Airfoil:	EH 2.0/10.0
Wing construction:	foam core with 1/32" balsa sheeting
Fuselage construction:	balsa sheet
Power:	Robbe Speed 400 6 volt motor, direct drive
Propeller:	Graupner CAM 5x5 prop and spinner
Speed controller:	New Creations 30 amp controller with BEC
Receiver:	Hitec-RCD 535
Receiver antenna:	Dean's base loaded
Battery pack:	7 cell Sanyo 500AR
Servos:	FMA S80 (micro); one buried in each wing panel
RIF weight:	15 ounces

build this little wing. My wife named it the JackWabbit. I think I'll try to build JackWabbit 2, and get the wing sweep right this time! In the mean time, I am already receiving requests for plans and wing cores for JackWabbit 1."

While communicating with Dennis, it became apparent that the wing twist is indeed too much, despite the smaller than intended sweep angle. It appears that too large a design C_L was plugged

into the Panknin program. As set up, a lower C_L is needed when powered, and thus down trim is required. If the design C_L is lowered, less twist will be called for by the Panknin program. This may necessitate some small amount of up trim when in gliding flight, but that pitch up under power needs to be eliminated from within the planform. With 20 degrees of sweep, the twist should probably be reduced to one degree.

Congratulations, Dennis, for a great looking and good performing design! And be sure to keep us updated on JackWabbit 2!

The Panknin program mentioned in this article is written in QuickBASIC, but can easily be ported to other forms of BASIC. It can be downloaded

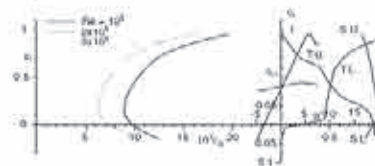
from our web site <<http://www.halcyon.com/bsquared/>>. Coordinates for all of the EH sections, including the EH 2.0/10.0 which Dennis used, can be found there, as well.

Readers with similar success stories (or failures for that matter) can contact us at P.O. Box 975, Olalla WA 98359-0975, or by e-mail at <bsquared@halcyon.com>. ■

UNDERSTANDING POLARS WITHOUT MATH

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Reading a Change in Directions For RC Soaring

...by Lee Murray
Appleton, Wisconsin

The nature and popularity of competition between sailplaners is far from stagnant. In 1977, when I became interested in R/C soaring, thermal duration models were typically flat bottom, light rib construction floaters, with poor penetration. Sailplane competition wasn't lacking in Wisconsin at all; as a matter of fact, large soaring groups were more active back then, than now. They included Milwaukee's Suds-City Soaring Team, large contingents of flyers in Madison's MARCS club, and Green Bay's RUF club. For whatever reasons, the number of contestants and sailplaners has dwindled, as have the number of contests and the entries in those contests. The trend is far from a local one, and we have seen a number of kit producers come and go. Models are higher performing, more complex, and more expensive. For the most part, die cut and machine kits are gone. Laser cutting may have extended the life of balsa rib construction, but these kits are not usually found in AMA rule book, thermal duration events outside of the hand launch class. The formula for winning a the typical AMA rule book TD event is to:

1. Practice! Always an important part of winning. Enough of this, and talent, can reduce, but not eliminate the other 6 factors.
2. Have a multi-channel sailplane built to take high energy winch launches, and convert that kinetic energy to higher altitudes (potential energy).
3. Use a high performance airfoil with an accurate surface (not open bay construction).
4. Composite fuselage capable of taking hard landings and launches.
5. A computer radio to coordinate turns, optimize configurations for launch, cruise, thermalling and landing.
6. Glide path control devices (flaps to

deflect up to 90 degrees) to hit the landing spot at the target time.

7. Sharks teeth or skegs to stop the model where you put it down.

The improved performance provided by modern designs causes contest directors to design the contest tasks to define differences between competitors and their models, allowing the most skilled contestants and the best designs to win. It all seems very natural — doesn't it?

There are those who are driven to improve themselves and their models. Competition is all around us, ...in our schools, in sports and in our jobs. It causes productivity to improve, and products such as our sailplanes and radios to be improved. The monetary expenditures to stay on the "cutting edge" with equipment is often large. I read of the decreasing participation in F3B and Unlimited Class slope racing where the cost per model is approaching \$1000. Competing in TD today is too expensive for many, and too foreign to the reason that most sailplaners fly: for the fun of it.

Now, to the topic of this article....

There are things happening now in thermal duration which may provide alternatives to the present AMA TD contest formats. They limit either the model, the flyer skill level in a class, or the launch equipment.

Skill Classification:

Many contests have a Sportsman class, which restricts the participants to those who haven't won a TD contest, or don't normally fly sailplanes in competition. This sometimes includes excellent flyers, who could compete successfully in the conventional categories. In my club's experience, we've run out of enough participants who haven't won the sportsman class; no new blood. In more than one contest, sportsman have entered and flown 6 channel, high tech sailplanes against Gentle Ladies and Spirits. Guess who wins?

One idea I read on RCSE (I can't give credit, as I no longer have the posting), proposed having a mentoring flyer contest where an experienced flyer would have to have a neophyte to

HEY, YOU GUYS LET'S GO SOARIN!
CAN SOMEBODY LOAN ME A GLIDER?
HEY, WHERE IS EVERYBODY?



coach. Sounds good to me, but can we get enough newbies to do it, or enough people willing to coach vs. fly? Mentoring should be part of our normal club activity and present at any contest where new competitors are competing.

Model Restrictions:

Older sailplaners remember the fun they had back when models were simpler, and less expensive; two or three channel radios were all that was needed. Many would like to revisit those days. I think Nostalgia is being flown today mostly for that reason. I talked to "Mr. Nostalgia - the keeper of the rules", and former LSF VP, Jack Lafret, who pointed me to a recent article he did for *QFI*, June - July 97. The article listed the latest rules pertaining to this class. If you are not familiar with this special class, which has been flown at the LSF/AMA NATS for four years, I will very briefly, but not comprehensively, list them here. The rules, which first appeared in *RCSD* in Feb. 1994, have been modified once; future changes are also possible.

- The model must have been in production or have the plans published by January 1980.
- Only original airfoil may be used.

- The side and plain view must match the original.
- Original construction is to be used, with limited changes allowed in dihedral and materials for strength reasons or mounting preferences.
- Upper wing spoilers can be added if glide path control was not designed for the model.

A number of models which fit into Nostalgia are listed (123) in the *QFI* article. Jack recently commented to me that the Windfree is back as is the BOT (Bird of Time), and others are on the way... The Challenger is a great example of niche marketing for this event. These are not just old tools re-instituted, but a completely new set of tools; so, the event is catching on and creating sufficient demand for companies to invest tooling dollars. Dream Catcher Hobby, Inc. has brought the Sailair, the Nomad, and the Breezy back into production. I have heard rumors that the Olympic II may also be brought back. Jack has an e-mail address of Tailspin@tir.com. You can get on his mailing list for rules changes and ballots for changes. If you aren't on the net, you can reach him at 519 Boutell Dr., Grand Blanc, MI 48439 or just phone him: 810-694-2490. In one of his communications to me, Jack said that this interest parallels his interest in street rods. If he had his way, the models would only look like the older ones, but would have all the airfoils and gadgets which can make them fly better. He does enjoy having an alternative to AMA TD events.

Another area of model restriction was addressed by rudder-elevator-spoiler (RES) contests, held in a number of areas of the US, and by the Modified Standard rules change proposal. A proposal, which went beyond a simple 3 channel restriction, was described in *RCSD* (Nov., 96) by Bob Johnson. Bob anticipated problems having very large models compete with smaller ones in contests where landing was not a problem; he put a 110 inch limit on the models. It also served to make all models in this class launchable by highstarts. Bob also guarded the "creep" back into expensive high technology by having limits as to what

could be moved with three channels, specifying that the trailing edge was fixed. Arresting devices to halt the model were prohibited, which would tend to open the scoring for landings from the little sweet spots seen in regional contests, and help keep the models looking like sailplanes. Safety considerations were weighed on both sides of the issue. (Do you keep the model from sliding into someone, or keep the skegs from hurting someone they might brush against?)

The cost was believed to be limited, because no benefit was anticipated from a computer radio; anything more than three channels would be superfluous. The proposal was discussed extensively on RCSE, the Airage sponsored mailing list. There didn't seem to be a consensus for resistance, but some felt it would increase their already high investment in models by adding a specialty model. Others felt it would restrict the number of flights they could fly in a contest (a point which would depend upon the contest). Still other flyers enjoy Standard Class contests being flown in Michigan and a few other places. Some said that it could not accomplish its goals and, therefore, should not be given an AMA classification until it had proven itself as a popular contest mode. The Soaring Rules Proposal SO-99-1 failed the initial vote of the *Soaring Contest Board* by a one vote margin of 6-5. This board was composed of sailplaners. It will be three years before another proposal can be submitted, and years after that before it becomes a rule. It was only after the official vote that some people in leadership positions accept that there was more support for the initiative than was evident on RCSE, where many supporters of the proposal lurked in the weeds.

Launch Restrictions:

Lastly, I will mention the HAM rules which are disseminated by Al Sugar of Texas. Al's approach to the problem is to limit the launching force and height provided by highstarts, tow lines and winches. The competition takes on a new dimension, and relatively inexpensive planes; well practiced pilots can compete effectively.

HAM Launching Equipment:

1. HAM Highstart, made up of 50 Feet (15 Meters) of rubber (unstretched maximum length), 175 Feet (50 Meters) of line (unstretched maximum length), and a tension requirement at launch not to exceed 15 Pounds (7 Kilograms). Overall stretch of the Highstart System should not exceed 70 paces. The HAM Highstart is 1/2 the size of a 'standard commercial' highstart.
2. Hand Tow Winch, with 250 Feet (75 Meters) of tow line, which may be measured when stretched to a tension of 15 Pounds (7 Kilograms). One Tow-Man - no Pulleys allowed.
3. Electric Sport Winch, with a maximum of 650 Feet (200 Meters) of line. This is a maximum of 325 Feet (100 Meters) to the turnaround. The winch must not exceed 15 Pounds (7 Kilograms) tension at stall. If your winch has a longer line installed, the winch line may be 'tied off' at the winch (or otherwise limited) to the permitted length, using the bulk of extra line on the drum as a torque limited to help in establishing the proper maximum tension.

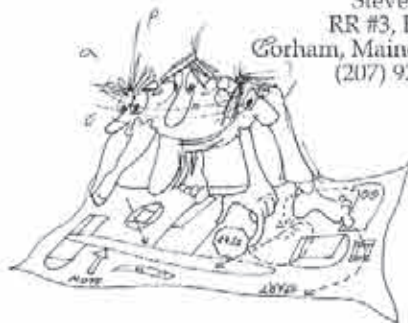
(Note: Launching methods may not be intermixed.)

Summary:

The need exists for a less costly and rigorous competition format, which will help the new sailplaner and those with limited means to succeed and feel comfortable, without breaking the hobby budget. Evidence for a change can be seen by the growth of alternative competition formats: F3J, hand launch events, foamy combat, nostalgia, and the shrinking size of F3B and unlimited class slope racing. If a uniform, low cost, class definition is established, I believe it will benefit the long term health of the RC Soaring. A yet to be defined consensus of those now in the sport may be needed to develop a winning approach. Once the approach and the support of the soaring community is clear, kit makers will support it with appropriate models as seen in the alternatives already mentioned.

"SHORT CUTS"

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Wing Rods, Carbon Wings

This is going to be a short article, as the Elmira 97 Aerotow event is just four days away; there's still much to pack, but at least this time the new plane is finished. The Viking Models 1/6 scale Salto came out just fine, with minor exception of my ability to spray paint.

I really wanted this plane to come out nice, so I tried to stack the deck in my favor. This was done by spraying the fuselage with semi-gloss Krylon white. The semi-gloss helps hide minor imperfections and inconsistent spraying patterns. (I'm not much of a finish person.) After all, how many full size sailplanes have a Monokote type gloss paint job? The paint cure was accelerated with a heat gun at 2' distance and, after the paint was allowed to set for 3 hours, the whole thing was wrapped in an electric blanket for 2 days.

The next step was to cover the carbon bagged wings. The first step in this process was to hinge the ailerons with plastic strip hinges, just below the upper carbon skin. Any imperfections on the upper surface were filled with spot putty and wet sanded smooth. Ultracote plus, the sticky stuff, was used to cover the upper surface. The work area must be perfectly clean, because when the backing is pulled off the covering, the static produced will literally make the hair on your arm stand up. With the help of OFB Walter Mudgett, we taped the bottom side of the ailerons to the wing to keep all surfaces straight, and began to cover the black wings. (The black did not gray out the white covering.)

The Ultracote plus was applied, as per the directions supplied. This will take two people to do correctly. No heat

was used for this step, except for working the wing tips, and sealing the leading and trailing edges. This covering material is not easy to work with on a mylar finished wing, because it grabs so well; but the final results are worth the effort. I can't image using heat to set covering on a vacuum bagged wing.

The wings looked great; in fact, too great. I now had high gloss wings with a semi-gloss fuselage. Three rolls of steel wool later, and I had a nice satin finish. The ailerons were then cut free on each side; the hinge line remained covered by the covering, which results in a great looking hinge line. A bit of gap seal on the bottom carbon surface and the wings were done. I did not want the additional weight and reduction of visibility, on the bottom wing surfaces, so they were left uncovered.

Now that the wings were covered, I had to attach them somehow to the fuselage. This plane will eventually be sloped up here in Maine, where landing areas are quite small. I wanted a wing rod system that would provide a lot of flex on landings, but still perform well on aerotow and aerobatics. My first thought was a 5/16" steel or titanium rod for the 90" Salto, but that would result in something breaking on tough landings. I opted to go with two 1/4" rods. One rod to be steel, the other was sleeved with brass tubing, epoxied to the outer surface. For slope, I would use a standard, hollow 1/4" carbon rod and the brass sleeved carbon rod; and for aerotow and aerobatics, I would use the steel rod and brass sleeved carbon rod. The steel rod weighed 3 oz. and the carbon rods each weighed .7 oz. I did not sleeve the wing roots to accept the rods; I just drilled the holes to exact size, which gives a great fit. The holes in the root rib for the sleeved carbon rod were oversized to fit the tubing O.D., and the sub-root rib was drilled 1/4" for the rod. The brass sleeve that was epoxied over the carbon rod was sized in length to fit between the two sub-root ribs, which centered the rod perfectly within the two wing halves. The strength afforded to the hollow, carbon rods from the brass sleeve is considerable, almost doubling the stiffness with virtually no weight added. This two rod set up worked out quite well, and an alignment pin was still used at the trailing edge.

'Til Next Month! ■

FIGHTING FOAM & HEAVY IRON

VOLUME 2, NUMBER 1

By David M. Sanders
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YEAR TWO!

This edition of "Fighting Foam & Heavy Iron" marks the beginning of my second year on this column. I'd like to give a special thanks to all of you who've been with me over this time, and a hearty welcome to those just coming on board! So, let's get to the meaty stuff.

INTERNATIONAL FLAVOR

For those of you who represent the hardcore PSS crowd, you may want to follow developments in Europe. As many of you know, PSS in Europe and Great Britain follows a far different tack than that here in the States, as most European modellers emphasize exact scale models. With these special challenges, they have a far different mindset than we do on model construction and finishing, as well as performance standards.

For a real insight on their methods, there is one place to get up-to-date information, on the very latest developments, in the form of an outstanding newsletter, produced by Great Britain's Power Scale Soaring Association (PSSA). The newsletter is published quarterly and is in a format very similar to *RCSD*: an actual, magazine style pamphlet. Edited by the very capable and respected Alan Hulme, it's absolutely packed with terrific articles from Association members, who include some of Britain's most noted craftsmen and fliers. Of course, it's all aimed dead-center at the real die-hard PSS enthusiast, and covers everything from events to construction technique and human interest stories. Some of the models in the pages of the PSSA newsletter are stunning works of art, and real inspiration for our own achievements on this side of the Atlantic. As well as the usual WWII

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Andy Mitas' highly modified and refined DAW Focke Wulf Ta-152 in mid-war, forest camouflage markings. Check out awesome mottling on fuselage - nice job. Photo by Andy.



Can you believe this actually happened in flight?! Gregory Matson took this shot immediately after recovery of the downed planes (or plane?) at Sunset. Birdworks Zipper meets foaMe109... No, not an experiment in genetic engineering... Just a plain old accidental mid-air! Happily, both planes came away fairly healthy, and still fly today.



Aerofoam 49" span EPP Corsairs on the ramp at Los Banos '97. These planes were very impressive and ingeniously designed, with combat and rough sport use in mind. The foreground plane is missing its EPP spinner cone, which attaches with velcro. Shelby Sanders photo.

R/C Soaring Digest



Chris Pratt's giant size Spitfire Mk. XIV, from a Yellow Aircraft power plane kit, won Best PSS at Los Banos this year. Shelby Sanders photo.



Los Banos local Mickey Lewis' P-51B converted to PSS from an ARF power plane kit. Shelby Sanders photo.



Larry Jolly's slick little speed 400 powered Me163. Like it? Could be a future kit release! At 1/12 scale, it sports a 32" span and weighs in at 17 ounces. Shelby Sanders photo.

July 1997

cra models, these guys have a real affinity for modern designs, including jet fighters and present-day utility and cargo aircraft.

If this sounds good to you, consider becoming a member of the PSSA! International membership costs 15 pounds, which equates to about \$30 in US funds. I was able to get my membership charged on my credit card, so no trouble there. Address inquiries to: PSSA, c/o Alan Hulme, 52 Mountway, Waverton, Chester CH3 7QF United Kingdom. I can assure you, you will not be disappointed!

FOAMIE GOES NAVY!

At the '97 Los Banos Slope Scale Fly-In, I got to see for myself three examples of Aerofoam's brand new, 49" span, F4-U Corsair EPP Foamie. What'd I think? Man, it really looks great... And they fly pretty darn well, too. When I first read about these on the internet, I gotta admit I was pretty dubious. But... In spite of the very round fuselage section characteristic of radial engine aircraft, the examples I saw flown exhibited very nice flight performance both in light-moderate to moderate slope lift, as well as demonstrating very good bungee launch performance off typical heavy-duty, red-rubber, slope bungs.

By far the most impressive aspect of the finished models is designer Mark Mech's solution for the classic smooth bend of the Corsair's inverted gull wing. The spar is a full-depth, pre-shaped component made of high-quality 1/4" aircraft plywood. The piece I was able to examine was definitely adequate for use in hard combat; no problem. To this are mated separate fore and aft core sections of EPP to form the wing section, which follows the smooth gull curve of the spar. Outboard panel ailerons are cable actuated. I watched Mark demonstrate a dry fit of the parts to a prospective customer, and the process looked easy enough.

The unmistakable lines of the Bent Winged Bird's fuselage are almost entirely pre-cut at the factory and looked really good - only minor shaping of the canopy area, cowl ring and tail cone are required to get an

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excellent scale look. They also sported an EPP spinner cone just slightly larger than scale, which gave just enough of a finished look to make the whole plane's lines very convincing and provocative.

Tail assemblies were of good ol' Coroplast. By the way, as an aside - I'd love to find a different material for tails, but none of us guys who make foamies have really thought of anything better. Just goes to show.. There's no free lunch.

Mark said their models were coming in between 32 and 39 ounces. With their slightly larger wing area and E374 airfoil, their flight performance is right in the same ballpark as a DAW warbird.

Construction, outside of the wing's unique methodology, was typical EPP foamie as you'd expect, which is great, of course. Any previous EPP experience would be perfectly useful on these models - good job, Mark! Get a hold of Mark at: Aerofoam, 1913 East FJ Parque, Tempe, AZ 85282; (602) 968-6007, aerofoam@earthlink.net

The foamie Corsairs will be selling for \$75.00 retail. Also, Mark has taken over production of the Dave Wenzlick designed foamie F-15's, and is selling



Zagi X2. Yes, this is a huge, double size, pink foam Zagi! Note use of dual servos on the elevons. Flew great in light slope lift at Los Banos. Shelby Sanders photo.

those kits for \$45.00.

And, they had a little different way to cover 'em....

DIFFERENT STROKES

Mark also had an interesting covering method he and his cronies dreamed up, which appeared to be holding up as well as any of my own U-coted planes. They cover the whole plane with non-reinforced vinyl packing tape over brushed on Weldwood contact cement; then cover over that with 1.5 mil self-adhesive sign vinyl. Their planes appeared quite

smooth, looked nice, showed good adhesion and good heat resistance - they sat in the sun in 100 degree temperatures all day with no problems. Mark says he's learned some other handy foamie construction methods that he'll be passing on to us right here in the future, too.

SNEAK PEEK AT LOS BANOS

This year, I covered Los Banos for *Model Aviation*, and you'll probably see this a month ahead of that. Soooo... I've included sneak peeks here of some of the neat foamie and PSS stuff Shelby and I got to see there. Be sure and check out my friend Joe Chovan's complete coverage of Los Banos '97 here in RCSD, too!

NEW TALENT...

As promised, we do indeed have a new



Mickey Crowley and his scratch built Mustang. 48" span, 16 ounce model was a hot performer in Mickey's capable hands. Wings are un-sheeted blue foam with low temp covering.



Willy Grundler's beautifully finished, scratch built A7E Corsair II (front in photo). Fuselage is lost foam construction. Willy has two wings for this plane: one set that's exact scale and the stretched set seen here. Great flying plane and a real looker, even up close! Colors are for VA-86 from the USS Nimitz. Shelby Sanders photo.

Reader's Ride inductee! This time, it's Andy Mitas of Champaign, Illinois. A while back, he acquired himself a DAW Ta-152 (34 3/4" span, approx. 16 ounces) to try his hand at airbrushing and detailing a small size model; these were the results. (See photos, please!)

In addition to the Testor's paint over Silkspan finish, and excellent airbrushed mottle/zig-zag, splinter camouflage, Andy built in a semi-scale cockpit pan, with instrument panel, and formed his own clear canopy from acetate sheet. The addition of a hand-crafted pilot figure completes the look. The pilot figure was built-up from wood, epoxy putty and tape! Is this guy inventive, or what?!

Other slick do-dads include the carved wood exhaust stacks and thin ply cowl flaps. For the final topper, the entire plane is panel lined (following techniques I outlined in a two-part article for *Model Airplane News*, March & April issues), and carefully weathered to get that perfect war-worn look!

So, there you have it... Quite a project... Not too shabby for a middle-American high school freshman, huh? Congratulations, Andy, on a job well done and keep 'em coming! Check this out folks; the next generation still cares about good scale models!

TIME TO SIGN OFF

Well, I could go on for more, but I gotta save some for next time, right? So, off to the thousand other details clamoring for attention! See ya'll in a couple months; and, as always, thanks again for reading and all the kind notes, e-mails and calls over our first year in the fur-balled skies!

PERFORMANCE COMPOSITES

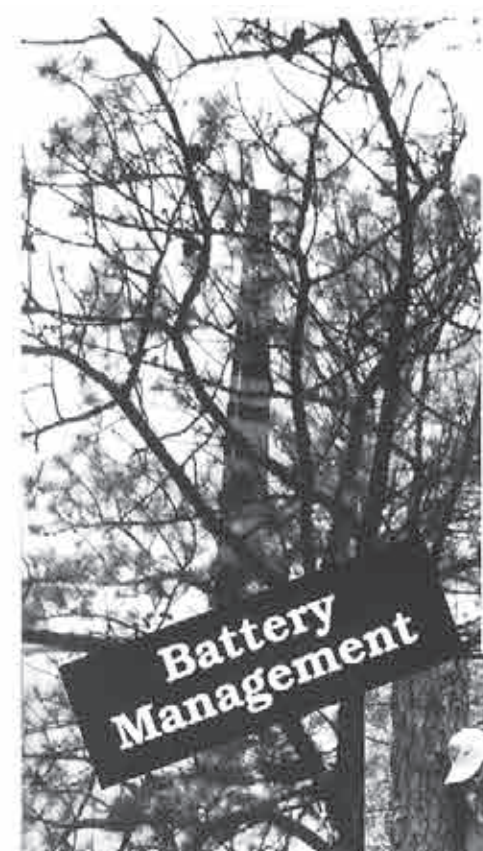
Before buying your next glider, make sure to get our brochure on the many variants available of our popular Starling and Starship, 60" and 2m gliders. All feature rugged 100% Kevlar[®] fuselages.

PERFORMANCE COMPOSITES

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Battery Management

This is the result of poor battery management! The prize sailplane develops a mind of its own, and lands in the top of a tree in a forest. We had to get a real aircraft to find it! Then, it takes a friend who knows how to climb. And, what goes up must come down! All's well that ends well, but I told myself, "Next time, check the battery with a voltmeter under load, dummy!"

What follows will be useful no matter what you fly. Basically, this is what we have learned in the past couple of years about battery management.

You may have heard that during the various airtow fun flies this year, one or another towplane "flew all day long". "How can this be done," you might well ask, "When you can only safely fly an hour or two without risking battery failure?" When towing many sail-

planes in events such as the Elmira fly-in, or the Canadian event in 1996, we try to manage our batteries, so as to be able to tow all day long, with just a few short breaks. What follows is how we do it.

Batteries

I use up to 2,500 Ma. 4-cell battery packs (5-cells are OK) in my towplanes. Most recently, I used one large battery and one 1,000 Ma. battery as a battery back-up. If you're going to use one battery, that's OK, but you should

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really check it every time you need to fuel up; every 3-5 airtows, but not more!

Battery Back-Up

I use a Jomar (EMS) battery back-up system, which is extremely simple and easy to install: two on and off switches between the back-up system and the batteries, and one connection into the receiver. If the main battery (the 2,500 Ma. pack) begins to run low on voltage, the

smaller battery pack immediately takes over. On landing, there would be a red light visible in the airplane, and as long as I looked at it, I would note if I had a battery problem, and would attend to it.

A Battery Tester

A Battery Tester is an absolute must. If for some reason your charger did not fully charge the batteries, you will catch the problem on the ground with the battery tester. However, please note, your battery tester must test the batteries under load. It's not enough to check the voltage; you must check the voltage with some drain on the batteries to make sure that you have enough juice left to fly. Sooner or later you will have a battery problem of one kind or another, and the battery tester will save your airplane! Several battery testers are available on the market, which test the batteries under load; any of these will do. I check all the batteries in the airplane EVERY TIME I land and cut the motor. This is an absolute must, and all the more necessary if you do not have a battery back-up system.

The Charger

Make very sure that your charger will charge a large battery pack. Most radios come with a charger, which will charge only a 600 Ma. pack, and if you use this same charger for a large battery pack (2,000 Ma. or larger), you will be essentially flying with half a charge. You must get yourself a charger large enough to adequately charge a 2,000 plus Ma. pack (250 Ma. charge for 18 hours to recharge a well-used battery).

Recycling

It pays to cycle a battery every once in awhile to make sure that the battery is good and that it has no cells that are beginning to go bad. It's very handy to be able to cycle them for this reason; also, if you are stuck with lousy winter weather and the batteries lie dormant for a long time without being used, it's good to recycle them in the springtime, before you start your normal flying. If you find that a battery normally is good for 120 minutes (recycling time), for instance, and it suddenly begins to drop, chances are you have a bad cell



Always check batteries with a voltmeter under load. I prefer a push button type, because I can see the difference between under load and voltage "at rest".



The Rx battery has been cycled 210 minutes. The unit is supposed to switch to charge for 16 hours. If you get an electrical surge or dramatic current change, the unit goes to trickle mode. Always test the batteries to make certain they have been fully charged!



Just dial in the charge rate. It will charge Tx and Rx batteries!

in there; sooner or later, it will cause you a major problem. Again, every time you go to fuel up your airplane, make sure that you check your battery (or batteries) with the above mentioned volt-meter.

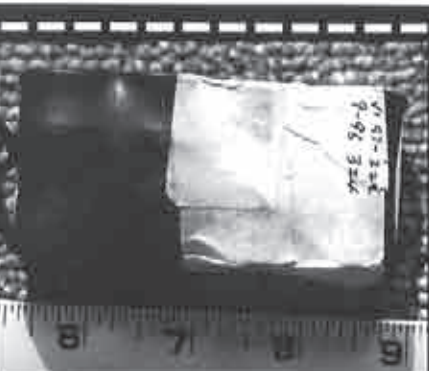
Field Charging

Very often on weekends, when I airtow, I fly for a couple of hours or more. Also, if I am responsible for airtowing a whole group of guys at an airtow fly-in, I may fly considerably longer than that. Eventually, I will get to the point where the batteries in the towplane and the transmitter need charging. I do this with a 12-volt field charger. There are many of these on the market; just make sure that you pick up a good one that works well. If I take a half-hour lunch break, I can hook the airplane and the transmitter up to a 12-volt source; in half an hour, I will be ready for another hour or more of airtowing.

After I have "field-charged" my batteries, what should I do before I fly? You guessed it! CHECK THE BATTERIES WITH MY VOLT-METER UNDER LOAD!

Recently, I did quite a bit of towing in Canada with my Spacewalker, and ended up field charging twice during the day. This enabled me to fly virtually the entire day, except for two, 20 minute field charges.

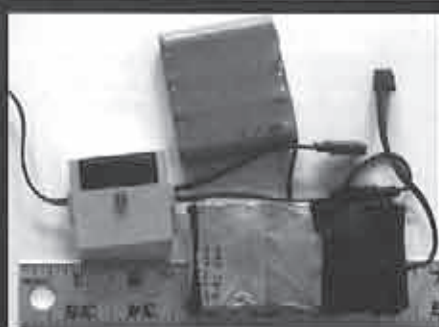
Be careful to make very certain that your 12-volt power source is not low



I mark my batteries to keep track of how they hold a full charge. In September, 1996, this one had 324 minutes to recycle. If it suddenly drops, this might signal a problem. Always best to find this out, on the ground!



This charger is not automatic, but it will charge at whatever rate is dialed in. It won't harm the batteries if left on longer than 16 hours. At 200 Ma, a 2000 Ma pack can be fully charged. Still, do check batteries with a voltmeter, under load.



The EMS battery backer couldn't be simpler to use. Plug the left hand side into the Rx, the right 2 plugs into the main unit and back-up battery. If the main battery fails, the unit switches to the back-up, and a red light goes on! In gliders, I don't use an on-off switch; in powered planes, I do use a switch harness.

on juice itself. Very often if you charge from a worn out 12-volt battery, you will not get an adequate field charge, which could lead to problems when you are flying.

The Transmitter Battery

The Transmitter Battery is monitored by a meter on the transmitter. Almost all new transmitters have a visible volt-meter, and if yours does not, then be very, very careful; check it every time you stop your motor! I have an 850 Ma. pack in my (Futaba) transmitter, which gives me up to 90 minutes of continuous flying time. At 9.6 volts, I watch it very carefully; at 9.5 volts, I immediately land and recharge the battery. You should know how long your transmitter battery will last when fully charged. Don't wait for the alarm bells to go off, signaling a low battery, while flying!

Conclusion

If you get together with a couple of friends and do three or four airtows a day, you won't need all of the above-mentioned accessories. On the other hand, if you do get together with three or four or more avid sailplane enthusiasts, you may find that you will be airtowing them all day long. In this case, I heartily recommend all these tools, which will help you airtow for many hours on end without mishaps.

Good luck and good flying! ■



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Mastering the Walk of Shame

...by Ron Weaver

Buffalo Grove, Illinois

e-mail: 72647.1276@compuserve.com

Sooner or later, even the best of us are forced into one of those nasty off-field landings. I'm not talking about landing short of the landing zone, I'm talking about landing short of the field, maybe in another county; possibly not even on the ground, but in or on some 'ground based object'. I won't even assume that the plane is under control at this point. But never fear! A little mental preparation and understanding can help you cope with the dreaded Walk of Shame.

The Walk of Shame is defined as any attempt to retrieve a downed model before any number of observers.

The actual amount of shame you will be subjected to can be expressed by the formula:

$$\text{Shame} = \frac{\text{Obnum}^2 + (\text{Dist}/\text{Time})}{(\text{Status} + \text{Excuse}) + (\text{Corrob} * \text{Status})}$$

and is expressed in BTUs (which you can actually feel!).

Read this as: the square of the number of observers that witnessed the event, times the distance you landed out, divided by the amount of time it takes you to cover that distance, all divided by your status in the soaring community, times the strength of your excuse, plus the status of any corroborators you can coerce, times their status in the soaring community.

You can easily see from this formula that to reduce shame, we need to reduce the number of observers, land closer (already a constant), cover the distance more quickly, or get corroboration of some kind from a soaring legend. (This is why soaring legends are in such demand as timers. Corroboration from an inexperienced pilot that no one knows has no value.) Therefore, a long, slow walk before a large number of observers will have a much higher shame value than a ride in a 3 wheeler that few people notice - that's even kind of cool. Now, factor in your status in the soaring community and the strength of your excuse. Everyone feels sorry for a soaring legend that experiences a downed

airplane. Obviously bad luck. Clearly something beyond his control. But if Joe Noname goes down, well... "Somebody take that airplane away from that guy! It's clearly ineptitude." A good excuse will go a long way towards helping Joe Noname reduce his shame but, as is implied by the formula, it's not the only way. Here are a few scenarios to help you get started in this art. By studying these cases, you can see how manipulating



ZIKA

various values in the formula can help you salvage some of your dignity by reducing shame.

Here's a common scenario.

You misjudged the distance back to the field, or the sink between you and the field, or the wind (since you're probably downwind), or forgot to switch out of launch mode, or any other dunder-headed error in judgment. When it becomes obvious that you're not going to make it back, you can put your plane in a flat spin, shout your frequency number (Get some help here; corroboration has some value.), and hold your transmitter above your head. This will cause people to glance down at their transmitters, or other transmitters, and they will join the chorus of frequency shouters. Chaos will ensue, but at this point, chaos is your ally. You have just succeeded in diverting a number of eyes from the actual incident. If you are really good, you can run toward the airplane at the same time, thus reducing the distance to be covered (remember our formula). A good sprinter can cover 100 yards in



10 or 12 seconds. You ought to reach your plane in an hour or so, unless you go down in a corn/bean field. See the paragraph on Corn and Beans, below.

OK, let's look at this scenario in light of our formula. The number of observers was reduced, distance was covered quickly, your excuse is believable, but shaky. You've got some corroboration, and maybe from a competent pilot that will actually be believed. Not bad. Unfortunately, repairs to your model have yet to be assessed. Let's improve on this by starting the shouting AFTER your plane is already on the ground. To pull this off, have your timer check the other planes in the air to look for lift. He may not see you go down, but will still gladly yell a frequency number when you start to. That's all you need for corroboration to work. Now, that's better.

Here's another one.

You have just treated the crowd to a midair with another pilot. You can't blame the other pilot in this situation. He wasn't trying to hit you. To prove this to yourself, go to the field some time and actually try to hit another airplane. You can't do it. If the other guy was trying to hit you, he never would have. But take heart. A midair is a little like mortal combat. If you survive the collision and the other guy doesn't, you'll have 'survivor' written all over you for recovering. If you both crash, you've got a sympathizer (unless he's hostile because he thinks you were

trying to hit him), and if only you go down, you're obviously a hapless victim deserving of sympathy. If you can think to do it, and you want to work on your status for the next incident, dive the plane violently (a herky-jerky motion like a wounded minnow works best), pull full flaps, and land safely inverted. People will talk about that save for quite a while. Don't forget to make sure

everyone is watching by yelling something. The more people that witness the save, the more your status will grow. (There's another formula for this, but that's another subject.) The only thing that outranks this move, is making your time and a better than 50 point landing. Less than 50 points on the landing, and you should have gone for the save move, since your landing points will actually shrink with the numerous re-tellings, to the point where it's, "And, I think he got a few landing points, too." That's not what you want. You want the points to increase with re-telling, until you've got a perfect landing.

Now for a more difficult case.

One or more of your wings folded on launch. It would seem that there's not much you can do in this case, except hope no one was looking at the moment your wings exploded in a hail of whatever material you built them from, and your fuselage began to bear some resemblance to a sidewinder missile launched from an F-14. But you can be sure they're looking to see who is going to walk out to claim the wreckage. Here's a possible solution. Set the transmitter on the ground the instant your wings fold, since it's of no further use to you anyway. Get your timer (or a ghoul - see Ghouls below) to retrieve the fuselage (This is where most people will be looking.), and you can retrieve the wing that's now in a thermal. You have just transferred

some of the shame to your unknowing timer, since the crowd doesn't know that he wasn't the pilot. You *could* blame the manufacturer of your wings, the monster winch, or the thermal that went through just as you started your zoom, but it just makes you look petty. Try not to exacerbate the situation by leaving your foot on the winch pedal until the fuse hits the turnaround, and flag down a 3-wheeler if you can. To salvage some status, repair your plane with a rusty Coke can and some sticks you find laying on the field. A beer can is better if you can find one. Do this between rounds for extra esteem.

Are you starting to get the hang of it?

Okay, here's a little pop-quiz.

You've just landed in the top of a distant tree. What do you do? Since the distance is constant, and the time to cover that distance is probably very large (since we include the time it takes to retrieve the plane from the tree), your only hope is on the corroboration side of the formula. Turn to your timer and say, "Geez, I didn't think I was that close to that tree. Did you?"

Now, you've got him. Either he agrees with you (corroboration), or he says he did know. Now, it's partly his fault for not warning you. One of the finer points of corroboration is blame transfer.

BEANS & CORN

If you should happen to go down in a bean or corn field, you've got a serious problem. Whatever you do, *don't* ask a bunch of people to start walking the rows with you. You probably won't find your model anyway, and you'll irritate a bunch of fellow pilots that were previously sympathetic to your plight. Trust me, these people won't have anything good to say about the experience. Instead, rent a Cessna at the local airport, spot your model from the air, and when you return to the field, calmly walk directly to the model and retrieve it. Or have someone else retrieve it, while you fly a round with your backup. (See Ghouls below.)

GHOULS

Ghouls are like wreckage groupies. They will ask to help you retrieve your downed model. They, of course, aren't

really interested in helping. They just want to drool over the wreckage. The more small pieces there are, the more the ghoul gets off on it. You can use a ghoul to your advantage. (See folded wings, and beans and corn, above.) In fact, wherever possible, *never* retrieve your own downed plane. Get a ghoul to do it for you. Many people will assume it was his plane that went down. Heck, it serves him right for being a ghoul in the first place. The ghoul feels no shame; after all, he's had more than his share of crashes. This explains his fascination with your crash. He will internally revel in your misfortune, and the worse it is, the better he will feel about his own inadequacies. He may try to convince you he wants to analyze the wreckage for impact resistance data. That story doesn't wash, though.

As with any art form, there is a lot of room for 'creative' minds to work in. I've only barely begun to explore some of the possibilities. I hope that by expressing this art mathematically, I haven't scared some of you away from exploring the fascinating possibilities that exist in this arena. Good luck, and may all your walks be short and dignified. ■

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Schedule of Special Events

Date	Event	Location	Contact
July 11-Aug. 5	AMA NATS	Muncie, IN	Competitions Dept., (317) 287-1256
July 12	CSS Club Contest	Cincinnati, OH	Ed Franz, (606) 586-0177 edkim_franz@msn.com
July 12	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
July 13	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
July 18-20	SHA Eastern Div. Workshop	Elmira, NY	Mat Redsell, (607) 569-2776 71750.2350@compuserve.com
July 19	CSS Family Fun Fly & Picnic	Cincinnati, OH	Ed Franz, (606) 586-0177 edkim_franz@msn.com
July 19-20	Masters of Soaring	Covina, CA	Don McColgan, (909) 626-1451
Aug. 2	HLG Contest	San Diego, CA	Tom Clarkson, (619) 486-4068
Aug. 2	Slope Combat	San Diego, CA	Arthur Markiewicz, (619) 753-3002
Aug. 3	2 Meter TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Aug. 9	RCHLG	Orlando, FL	Ed White, (407) 321-1863
Aug. 9	CSS Club Contest	Cincinnati, OH	Ed Franz, (606) 586-0177 edkim_franz@msn.com
Aug. 9	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
Aug. 9-10	XC Fun Fly	Mead, NE	Christopher Knowles, (402) 330-5335
Aug. 10	Gentle Lady	Orlando, FL	Rick Eckel, (407) 365-9795
Aug. 9-10	Summer Soar	Bristol, VA	Bernard Leonard, (540) 669-4387
Aug. 17	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Aug. 30-1st	SHA Western Div. Workshop	Tehachapi, CA	Dan Armstrong, (805) 822-8852 danarmstro@aol.com
Sept. 6	HLG Contest	San Diego, CA	Tom Clarkson, (619) 486-4068
Sept. 6	Slope Combat	San Diego, CA	Arthur Markiewicz, (619) 753-3002
Sept. 7	F3J	San Diego, CA	Mike Ziaskas, (619) 484-7596
Sept. 13	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
Sept. 14	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Sept. 13-14	Saltair One Design Contest	Cincinnati, OH	Paul Siegel, (513) 561-6872
Oct. 4-5	CSS Pumpkin Fly	Cincinnati, OH	Ed Franz, (606) 586-0177 edkim_franz@msn.com
Oct. 4-5	24th CVRC Fall Soaring Festival	Visalia, CA	Phil Hill, (209) 686-8867
Oct. 11	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
Oct. 12	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Oct. 11-12	Fall Intergalactic HLG	Cincinnati, OH	Paul Siegel, (513) 561-6872
Oct. 11-12	Fall Soar	Bristol, VA	Greg Finney, (540) 645-5772
Oct. 25	TIG Fun Fly	San Diego, CA	Don Richmond, (619) 587-0226
Nov. 1-2	Aerotow Fly-In	Pensacola, FL	Asher Carmichael, (334) 626-9141
Nov. 2	2 Meter TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Nov. 8	CSS Turkey Fly	Cincinnati, OH	Ed Franz, (606) 586-0177 edkim_franz@msn.com
Nov. 8	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
Nov. 15	New England R/C Soaring Convention	Portland, ME	Steve Savoie, (207) 929-6639 jim.armstrong@juno.com
Nov. 16	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Nov. 28-30	24th Tangerine	Orlando, FL	Don Cleveland, (407) 696-7516
Dec. 6	HLG Contest	San Diego, CA	Tom Clarkson, (619) 486-4068
Dec. 6	Slope Combat	San Diego, CA	Arthur Markiewicz, (619) 753-3002
Dec. 7	Open TD Contest	San Diego, CA	Patrick Dionisio, (619) 586-7997
Dec. 13	60" Slope Race	San Diego, CA	Bob Matheson, (619) 754-2657
Dec. 14	F3J	San Diego, CA	Mike Ziaskas, (619) 484-7596

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

Aug. 1-3	Akro Cup Semi-Scale Segler, FSV Dreiheich, Germany, Deutscher Modellflieger Verband*		
Aug. 1-3	Int. DM Scale/Semi-Scale Segler, MFG Kranish Simmerath, Germany, DMV*		
Aug. 16-17	Scale Fun Fly (GNATS), Nigara Peninsula, Canada	Gerry Krught, (905) 934-7451 Don Smith, (905) 934-3815 Mistral@niagara.com	
Aug. 21-24	Int. DM Semi-Scale-Motormodelle, MSC Condor Göttingen, Germany, DMV*		
Aug. 23-24	IGG Slope Soaring Weekend - Hahnenmoos, Switzerland (near Adelboden) http://www.interconnect.ch/customers/igg	Peter Aeberli, 011-41-1-915 37 53 Jack Kagi, 011-41-1-926 2187	
Sept. 13-14	DMFV Scale Masters Motor Glider - Germany	Winfried Olgard, or Bernd Wich 011-49-2 28 97 85 011 (direct line)	

Sept. 13-21	World Air Games	Turkey	Turkey Aeronautical Association**
Sept. 20	R/C Glider Euro-Cup	Uetze, Germany	Lars Biermann 011-49-5173 1377
Sept. 19-20	DMFV Scale & Semi-Scale, Germany	Bernd Stollenwerk Bruchstr. 16 52152 Simmerath tel/fax: 011-49-2473	Winfried Roder Schiffenborn 44 52156 Monschau tel: 011-49-2472/5148 e-mail: Winfried.Roder@t-online.de
Aug. 1-3	1st Aerobatic Scale Glider Contest, Germany	Frank Oeste, 011-49-6103/81801 Harold Seitz, 011-49-2236/67473 Jan Kurt Hoffman, 011-49-29042848	
Aug. 1998	F3J World Championships, organized by BARCS		

* Deutscher Modellflieger Verband - tele. 011-49-2 28 97 85 00, fax 011-49-2 28 9 78 50 85

** Turkey Aeronautical Association - tele. 903123104456/903123104840

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TIDBITS & BITS

Mid-South Soaring Championships

Need the results from the Mid-South event? Well, Ron Swinehart, who took High Overall in Thermal Duration, says they are posted at:
<http://shl.ro.com/~samfara/contests/resultsMS97.html>

Elmira 97

Need information about Elmira 97? Well, John Derstine says to dial up the following web site:
<http://www.geocities.com/CapeCanaveral/Lab/5739>

Solar Records News Flash Going for the Gold!

Or, It's not as easy as it looks!

(The latest news on the trek to set world records, as provided by Dave Beck. ED.)

"In the last episode, plans were made to set some new records for solar powered flight. The location of the attempt was to be Tucson, Arizona, where the sun always shines (during the day that is!), and the people are the friendliest you'll ever find. Two members of the Gang of 4 had earlier traveled incognito to Arizona and found the flight path as described, and the people friendlier than anticipated. Let's join the story with the Wisconsin contingent arriving in Phoenix on Friday afternoon.

"The air was filled with anticipation as the gang of 4 (Ted, Char, Lee, and Dave) strode off the tarmac and into the terminal. "Hertz all around," I said to the gal behind the counter. "That's too bad," said one of the members of the gang of 4. "You should have told me. I would have changed seats with you." The gal behind the counter wasn't amused. She said, "We know your type, and we have just the cheap car you need for this mission. Before we knew it, we had 2 cars

ready to go. To avoid confusing us, the cars were exact twins; that's right, dual silver Ford Taurus. As we found out later, each was sized perfectly, so that our largest container, which held the golden model, would JUST barely fit, with one person pushing, while the other pulled. Phase one was now completed. We were in foreign territory, we had our wheels, and a map!

"Phase two was to meet with a guy named Darwin. We had never met Darwin, but knew of his theory: survival of the fittest. It was his plan we wanted to follow in our quest to set records. Darwin turned out to be every bit as nice as he sounded over the phone and, yes, had received a box from a trucking company called Nema. (That's "amen" spelled backwards.) Darwin worked for the police department and, when a box arrived that looked like a little coffin, there were questions asked. "Could I have the box," was the most asked question. Luckily, Darwin said, "NO..." He knew that the box contained the golden plane.

"We met at Denny's, to get the box. Using his policeman skills, Darwin had guarded the box well, and the golden plane was in excellent condition (maybe better than the way it was sent). Next, we talked over plans with Darwin. To summarize, he said, "Go south until you get to Tucson, then you're there; be sure to drink plenty of water, because we have a dry heat here, and you guys from Wisconsin will cook if you're not careful." Darwin is known for his good advice, so we decided to follow his instructions. At the urging of this policeman, we left town as soon as we could, and didn't stop until we got to Tucson.

"Once in Tucson, we set up a command post at the Wayward Wind's Motel and Speakeasy. Contact was made with Arizona agents, Ian Douglas and Bob Reynolds, for a rendezvous that night to discuss assault

plans. Meeting at Denny's, Bob remarked how unique our two cars were. He said, "Boy are your cars butt ugly! How did you manage to end up with two ugly cars that are exactly alike?" "Hertz," I said. To which he replied, "It hurts my eyes too!" Further discussions led to a plan to go for it on Saturday. We were now done with phase 3, and closing in on Phase 4...

"Saturday morning, with our convertible and pickup truck ready to go at the designated launch point, we got to experience something that never happens in Tucson; it was cloudy and windy. It was horrible; it was like Wisconsin! Tuning in the weatherman was no help... He only added to the misery, by predicting more bad weather. Oh well, "It will end by Monday," he said. Shortly, it began to rain, and even the most optimistic in our group knew, deep in their heart, that there would be no records in Tucson that day. Even though it was cloudy, the temperature reached almost 100 degrees. It was a dry, wet heat!

"When life serves up lemons, you make lemonade! So, our lemonade came in the form of a visit to world famous Pima air museum. Here were many interesting military planes to look at. Although they all had a story to tell, and showed great human achievement, I felt sorry for them because most were not and could not be world record holders.

"The next day, we were up early checking out the weather. It was only more bad news. The weather would remain cloudy well past the time we had allowed for our trip. Looking at the weather map, we saw bad weather from Mexico to California. Even Yuma, Arizona, the sunniest place in the US, with only 6 cloudy days per year, was cloudy.

"Finally, on Sunday, we all realized what day it was. It was Mother's Day! This legend has been written about before, but I had never believed in it! I had ranked this legend on a par with UFOs, Men from Mars, The Lockness Monster, and the Government helping the taxpayer. As the legend goes, on this day, no male is allowed to venture out of their yard, unless it is to visit their mother. It is absolutely necessary to either visit your mother, or to spend lots of time with the mother of your children, for fear of what will happen to you or anything you associate with instead of your mother. As we then found out, one of our members had experienced the curse of Mother's Day first hand, and had lived to tell about it. He described his first brush with the curse when he strayed away from home on this day. His wife had wanted him not to do it, but he bravely said, "You're not my Mother!" One hour later, his model was lost, but fortunately, he later recovered the damaged remains. As if that wasn't enough, he described how he had strayed from home a second time. This experience was even worse, as another model was lost to the Mother's Day Gods; only this time, the model was never recovered. Could it be that this curse had followed him from Wisconsin and had spread to the rest of us?

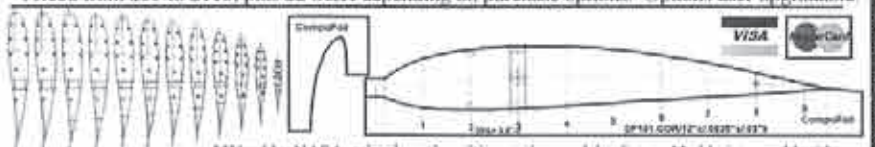
"We could take no chances on underestimating the power of this curse. The safety and well being of the team was all important, so we decided to skip Phase 4 entirely as well as 5 (the celebration phase), and went directly to Phase 6: packing our bags to head for home.


"Now, back in Wisconsin, our team is planning our next assault on the record books. It will be an altitude record, here in Wisconsin. But this time, we'll avoid any unnecessary chances, by not trying for a record on a holiday that anyone really cares about."

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1997 CIAM Soaring Report

(The following has been provided by Terry Edmonds, CIAM rep. ED.)

"This year's agenda had quite a few soaring proposals. There is probably more significance to those that did not pass, over those that did, but first, let me tell you about the ones that were approved.

"In F3B, the rule concerning a flight being canceled, because a turnaround comes out of the ground, has been expanded to include any associated parts, such as guy wire anchors, etc. This is considered a safety rule, and will be in effect 2 weeks after the minutes of the plenary meeting are released.

"Also, in F3B, the task A duration time will be changed to a 10 minute max. This will not be effective until the year 2001.

"In F3J, only two small clarifications were approved. In the wording of the rules, regarding the official flight being the last "flight" performed during the working time, the word flight has been changed to "attempt". The other item is, if there is a tie score in the fly-off, the winner will be determined from the higher score obtained in the qualifying rounds.

"There were also some changes in the provisional F3I class, however, since this event is not currently flown in the USA, I won't go into them. If anyone wants these

items, contact myself or the AMA.

"There were several F3B proposals that were either defeated or withdrawn that I will mention here, because they may resurface in the future. One item proposed was to put specifications and restrictions on the towline, itself. Current rules have restrictions on the winch, but leave towline selection up to the competitor. Another proposal wanted to limit task B distance flying to one side of the course, only. Yet another proposal was to prohibit the pilot from standing on the safety line in task C speed.

"Likewise, in F3J, there were important proposals that were not passed. A couple of them had to do with limiting tow energy. There are two parts to this issue. There have been several cases of tow persons being injured, due to a pulley stake coming out of the ground and hitting the tow person; and, other cases of towlines breaking and snapping back on the tow person. A related item is that current rules allow both a pulley to be used, and two tow persons, thus opening the door for a horse power race. The CIAM failed to pass anything this year to improve the situation, however it is expected that future proposals will arise and, because it is a safety related issue, could be implemented, quickly.

"Another F3J proposal withdrawn was to avoid mass launches, by extending working

time one minute more than flight max time. Concern that this proposal would change the strategy of the event caused its demise."

Fourth Annual Western Flyers Swift X-Country '96

(The following was received from Christopher Knowles, Omaha, Nebraska, ED.)

"Arriving home from the Flatland Open on July 14, a message on my answering machine said, "There will be no flying on July 20. PERIOD!" (We had been scheduled for July 20 & 21, since January!) Devastating, though a bit dramatic, is accurate. The pig and roaster were essentially moneys that had already been committed. We were looking at a disastrous gutting of the club treasury. There were people coming great distances, because ours is a two day event to ensure one decent flying day. What to do?

"The circuitous route traveled, to secure a place to launch and eat the pig, is too lengthy to pursue here. Saturday, the ceiling was so low that Paul Wright disappeared on launch for close to a minute. When he punched out the bottom, that Genesis was upside down, and moving FAST! That was our excitement for the day. One fellow, Jim Simonitch, test flew his Prism. Saturday became a pig out, on pig day. More than 50 people came and helped us eat the pig. There were boy scouts, and families of flyers we never see, embellishing



the ambience.

"Sunday was race day. It looked promising; there were puffy clouds and blue sky. Though we were down from nineteen competitors the year before, 13 teams were paid up and took to the course. Although the sky looked as productive as when Pat Flinn had previously completed 48 miles, he was able to do only 5.8 miles.

"Final standing were: Pat Flinn (5.8 miles), Steve Rohman (3.5 miles), Loren Blinds (3.4 miles), Kenny Bergstrom (1.6 miles), Paul Wright (1.2 miles), and Wayne Henning (1.1 miles).

"Last year, there was a NATS conflict. This year, we are two weeks after the NATS, there will be camping at the site, and roast pig!"

(Photo shows Pat Flinn receiving award from Christopher Knowles (R). For additional information on the 1997 event, see below.)

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SYNERGY 1	X	X	X	X	X
SYNERGY III-SI	X	X	X	X	X
SYNERGY 9/4-SI	X	X	X	X	X
SPECTER 3I	X	X	X	X	X
GENESIS 3I	X	X	X	X	X
EVOLUTION	X	X	X	X	X
REVOLUTION	X	X	X	X	X
SR 3I	X	X	X	X	X

*=Sail. **=Avalok. ***=Cross Country. SEQ=Sharc Improvement Option

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Wind Tunnel Tests of Wing Profiles

...by Martin Simons
Stepney, South Australia

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

Part III

Stuttgart tests

Some systematic wind tunnel work was at last undertaken by students at Stuttgart University under Wortmann and Althaus. The outcome was two volumes, **Profilpolaeren für den Modellflug** published respectively in 1980 and 85. A little further work has been done at Stuttgart since then, partly to correct earlier errors and to test some newer profiles designed specifically for models. There has also been substantial test work at Delft University in Holland and at Notre Dame University in the USA, published mostly in scattered academic journals around the world. There have also been a few major conferences on low speed aerodynamics at which most of those who had been working in the area have presented some results. (The stimulus for these came partly from the military who were interested in remotely piloted surveillance and reconnaissance aircraft. A few samples of the newer data are included in the later editions of my own book.)

In all cases, it was shown that the lower the Re number, that is, the narrower the chord of the wing and the slower the flight speeds, the poorer the performance of the wing. Beyond this it was not conclusively proved that any particular wing profile, or even type of profile, had any consistent advantage over any other of similar thickness and camber.

For instance, in the first Stuttgart volume (1980), the old Clark Y profile, designed about 1923-4, showed up as at least as well as the newer Eppler 193 with almost the same camber (3.5%), which at that time, was all the rage for model sailplanes. The Clark section was slightly thicker (11.7% as against 10.2%) which gave it a very slightly higher minimum drag, but extended its

good performance to slower soaring airspeeds. (Figure 5. About this time, I built two identical, 3 metre span model sailplanes, one with the Clark Y and one with the E 193 section, and could not detect any difference in performance.) It appeared that virtually no progress had been made in model aircraft wing section design since 1924.

What can be clearly demonstrated from these tests is that two factors remain vitally important for all model aircraft.

Thickness and camber

Wing thickness has a major effect on drag: a thin profile will have a low minimum drag, but also a rather narrow range of low drag values, in common parlance a deep but narrow drag bucket. It will be efficient at one airspeed. To achieve a wider range of reasonably efficient operation, less sensitive to small changes of trim in flight, a thicker profile is required (but not so thick that it runs into Schmidt's critical Re limit).

Wing centre line camber will determine the angle of attack, and hence the flight trim, for the minimum drag of the wing. That is, for each section there is a so called ideal angle of attack at which its drag will be least. Note that by changing the camber, with flaps, the pilot can change the ideal angle of attack to minimise drag for each desired flight condition.

Princeton and UIUC

There has never been anything before like the Princeton and UIUC work. After decades of struggling to find any information at all we now have available a great quantity of data together with a very clear explanation of how the testing has been done. In addition we have analysis of the theoretical basis of airfoil section design at model values of Reynolds Number, and whole new families of model wing profiles.

The problem is no longer lack of information, but to make sense of the flood that almost overwhelms us. ■

(Part IV continues the discussion on what is available, and interpretation. Ed.) ■

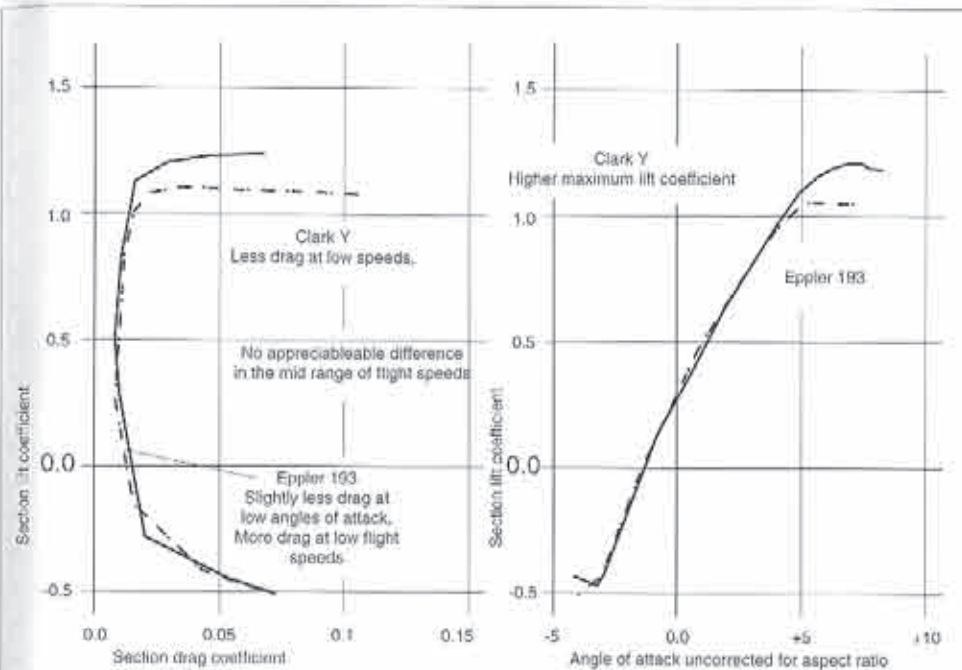


Figure 5. Tests at Stuttgart University on the Eppler 193 and Clark Y profiles indicated very little progress in low speed airfoil section design since the Clark sections were developed in the twenties.

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The Electric Connection

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Mississippi Valley Soaring Association Spring Soaring Contest

The MVSA held its first Spring Soaring Contest on May 3rd and 4th at our club flying site - Emerald View Turf Farm - just west of St. Louis, Missouri. An ideal contest site with plenty of grass to fly off of and just a few trees to catch the unwary, sort of like Charlie Brown and his kite eating tree! With 28 pre-registered entrants in Sportsman and Expert classes, the weekend looked to be competitive.

Saturday morning dawned cold and windy with low clouds and winds out of the NW at 15 to 20 mph with gusts to 28 mph; yuk! The pilot's meeting was put off to 11 a.m. because of an anticipated improvement in the weather and, when the appointed time came, it had indeed improved, sort of. The consensus was to proceed with an abbreviated number of rounds and, with 19 pilots in attendance, it was off to the winches to fly.

Round 1 found the conditions to be flyable though the Sportsman entries with models such as Risers and Spirit 100s, which were at a disadvantage in the strong breeze. In Expert, it didn't take long for someone to find some lift and climb high - just ask all of us watching Rusty Shaw speck out. Somewhat amazingly, there wasn't a single broken model for the day. I can remember a time not too long ago that we would have been notching a kill marking on the winch frame for a folded wing or broken model.

Saturday night, most of the group got together at Old Country Buffet and told flying stories, while eating to their heart's content.

For those who suffered through Saturday's weather, Sunday was the reward, with beautiful clear skies and light breezes out of the west-northwest. With 29 pilots waiting to take to the

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Rusty Shaw's flying a Grand Esteem this year. Peter George photo.



Jim Frickey about to launch his Super V 110. Peter George photo.



Brian Molloy shows that the Windsong still works. Peter George photo.



Alan Oliver tensioning the line for his Saturn 3.0. Peter George photo.



Harold Mantz showing good form with his Falcon 800. Peter George photo.



Mike Frickey and his Legend SC. Mark Nankivil photo.



Art Frost with his new Eagle derivative. Uses Tau nosecone Eagle fuselage with SD7080 wings. Flies great! Mark Nankivil photo.



Blane Miskell about to launch his Oly II. Blane is a up and coming flier. Mark Nankivil photo.

(L) Gene Trevino putting a little bit of body english into his Thermal Eagle's launch. Mark Nankivil photo.

Jerry Gross' Tekoa Shadow on final approach. Mark Nankivil photo.



Saturday's Results

Expert
 1. Mike Fox 1845
 2. Ron Weaver 1677

3. Rusty Shaw 1620
 4. Dale Nutter 1566
 5. Jim Frickey 1353
 6. Jeff Naber 1344

Sportsman
 1. Marc Browning 1057
 2. Ken Bergstrom 1021
 3. Tom Scully 724
 4. Vergil Spangler 637

Sunday's Results

Expert
 1. Rusty Shaw 2568
 2. Jim Frickey 2431
 3. Mike Fox 2403
 4. Dale Nutter 2403
 5. Mike Frickey 2292
 6. Jerry Gross 2251

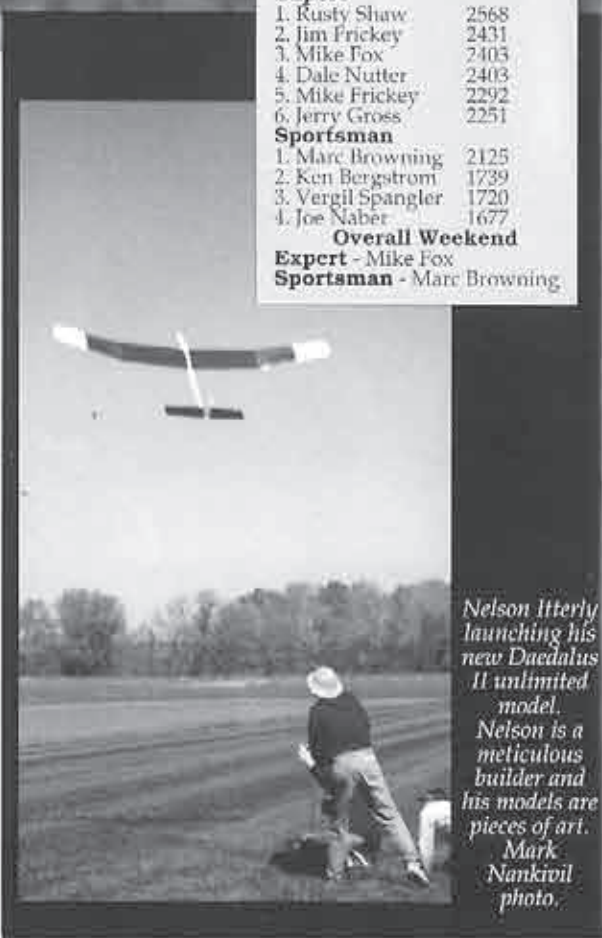
Sportsman
 1. Marc Browning 2125
 2. Ken Bergstrom 1739
 3. Vergil Spangler 1720
 4. Joe Naber 1677

Overall Weekend
Expert - Mike Fox
Sportsman - Marc Browning

skies, the first launch went off at 9 a.m. sharp. 5 rounds were flown, with all pilots to put in that round's flight within the 1 hour window - with an open winch, they could choose when to fly during that round's hour launch window. This worked out very well and made for a relaxed approach for the fliers and the winch masters. Two of the local club fliers had their models try to roost in the trees near the field, with one nesting and the other spinning to the ground with minimal damage.

With pilots from Kentucky, Kansas, Oklahoma, Nebraska, Iowa, Texas, Illinois, and Missouri, the turnout bodes well for future years. Thanks also go to Boy Scout Troop 978 who set up a food booth with food for breakfast and great brats and burgers for the rest of the day! So, for those of you looking to stretch your wings at the beginning of a new flying season, come join us for next year's contest. Hope to see you there! ■

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Nelson Itterly launching his new Daedalus II unlimited model. Nelson is a meticulous builder and his models are pieces of art. Mark Nankivil photo.



This Old Plane

...by Fred Mallett
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"Follow Your Tail!"

There are a few aspects to reading air, and finding that typically needed chunk of lift that will get you what you want. Rather important things like getting your time in a contest, or making it home from downwind to save the plane, save the flight, or save a long walk. This article gives away a bit of information that I got from Dafryl Perkins, and Joe Wurts.

I learned to read what I recently learned to call "ground signs" from my Dad when I was 14 years old and throwing free flight hand launch gliders. Over the last 6 years (after a 19 year rest period), I have gotten much more sophisticated in determining exact locations of local lift by listening, learning, and practicing this reading of ground signs. There are many good articles about using that information to determine what direction to fly to find lift. This article ain't one of them. We are going to talk about reading the air your plane is flying in, rather than the air you are standing in. This will allow you to determine which direction lift is in with respect to your plane.

This does two things. One, when your plane is flying far away from you, your ground signs may be indicating lift far from your plane, but close to you. Second, having some data from a second location allows some triangulation (Bi-angulation?), so that you can get a better read on the exact lift location.

To understand my description here, you must already understand how to read ground wind-shifts, and lift generated "wind-draw" to locate lift. If not, there have been a few good articles in past RCSD issues.

In very brief summary: If the steady state wind is north, and the wind suddenly backs to west, there is lift somewhere east. If the wind stops, the lift is north. If the wind doubles, lift is south (and various combinations for other vectors).

This is all great when you are about to launch, but how many times have you

July 1997

read the signs to see that the lift is east, then flown straight east, never to find lift? For me, it happened too often. I needed to learn to read the plane while it was in the air. After a couple conversations with the masters of the task, I started to figure it out, and it seems that it can simply be defined as "Follow Your Tail"!!

Let's try it. Say the plane is flying along, and suddenly the tail tips up to put the fuselage at a 20 degree tail up attitude. I think we all know that this is a happy sign; you are in lift; to follow your tail (it is pointing up), pull back on the stick, and go up (climb). What if the tail goes down? A nose high attitude is usually a reaaaally bad sign, as you are in sink. What to do? Follow your tail. Push that stick; speed up (Go down!), and get outta dodge 'til you find happier air. That was simple. So, how does it tell you which compass (horizontal) direction to turn??

Another Example

You feel the wind slow down; a happy thing, 'cause the lift is up wind, a happy direction to launch. Launch, and cruise straight up wind. (Let's call it north.) After a little ways, you see the plane appears to yaw to port (nose west, tail east). The reason is that the lift is pulling the air towards it, so the wind, where the plane is at, is from more of a westerly direction than where you are standing. Follow your tail; head east a bit more. The ground signs where you are standing might also reflect this; it all depends how far away and how strong the lift is. Let's continue this example. After turning east, your plane appears to slow down. Follow your tail, go backwards (Err.... Turn back downwind.), 'cause you have hit the "doubled" wind speed, north of the lift.

So, it is always easier to read this when the plane is flying straight away, or straight towards you; but with experience, you can watch that tail in most flight orientations. This is your best indicator when the plane is closer to the lift than you are. It also helps a bunch when you are trying to return home from way down wind, and would like to avoid sink on the way.

Have fun with this tip, and keep on following your tail.

(Editor's note: We think Fred has gotten too carried away with this tip, he was last seen flying endless loops...) ■

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HINTS & TIPS

...by M. S. Borden
Sellersburg, Indiana

Installing Outer Housings

The key to effective, slop-free, flexible elevator or rudder pushrod performance and long-term service is **RELIABLY** anchoring the outer housing to the fuselage. As long as I have been a modeler, I have deemed the use of epoxy or CA alone, to install the outer housing, completely **AFU**. If you plan on keeping and flying your sailplane for a long time, and/or you know what kinds of stress it experiences in flight and upon landing, you know epoxy or CA alone is insufficient. Adhesives don't stick well enough to the typical nylon-type housing to support it in high stress areas, but that's what kit manufacturers usually specify.

Here are my suggestions for installing outer housings in epoxy glass and wooden fuselages. These methods will allow you to fly confidently, knowing the outer housings will not detach themselves unless you "re-kit" your fuselage!

Keep the following rules in mind. Whether building glass or wooden fuselages, plan servo and pushrod installation **EARLY** in construction. Don't wait until the kit instructions decide this important step for you. Before beginning assembly, mark the location of the servo rails/tray, the fwd pushrod mounting point relative to the servo arm plane of rotation, and the aft pushrod mounting point/exit slot in the tail relative to the rotational plane of the stabilizer bellcrank or elevator (rudder) control horn. For slop free and friction-free inner rod performance, the outer housing must be supported at least every 6-8 inches and must be installed as straight as possible.

Let's start by installing a typical 1/8 inch O.D. outer housing in an epoxy glass fuselage.

- Determine the location of the fwd and aft outer housing mounting points.
- Slide a piece of 1/16 inch dia. piano wire into the housing (the piano wire holds the housing

straight). Slip the housing into the fuselage.

- Hold the housing in position; line up the very aft end of the housing with the aft mounting point; let the excess housing extend fwd past the fwd mounting point for custom fitting to the servo.
- Mark the location of the fwd mounting point, on the housing, with a felt-tip pen. Remove the housing from the fuselage. Leave the piano wire installed.
- Beginning at the fwd mounting point, mark the housing every 6 inches with a felt-tip pen, until you reach the aft end.
- Obtain a piece of 5/32 dia., K&S **ALUMINUM** tubing; this tubing is 1/8 inch dia. I.D.
- Cut a 1 inch section for the fwd and aft housing ends, and a 1/2 inch section for each of the locations between the fwd and aft ends. Debur each end of each tube section.
- Thoroughly clean the tubes (use a "Q-Tip") and the housing. (Acetone works great, but it's HAZMAT.)
- Slip the fwd aluminum tube section onto the outer housing; position it **near** its final location.
- Coat the housing at the fwd mark with baking soda, slide the aluminum tube section into place, carefully blow off the excess baking soda, and CA with a drop or 2 at each end of the tube. Repeat the last two steps for the remaining tube sections.
- Roughen-up the aluminum tube sections with 100 grit sandpaper; then completely clean the assembly again, and the inside if the fuselage. The assembly is ready for permanent installation.
- With the fuselage on its side, position the assembly in the fuselage and clamp in place. Clothes pins work great. Double check for positioning and housing straightness. Make sure the aluminum tube sections touch the fuselage sides.

Mix a generous quantity of 30 minute epoxy. I know what you're thinking; how am I going to get messy epoxy way down that tailcone to those mounting points? This is the cool part...

- Obtain a 24-30 inch section of scrap outer housing, the big stuff, about 3/16 inch in dia. Place one end in the epoxy and draw about 3-4 inches of the adhesive into the scrap housing like you were drawing an extra thick malt through a straw.
- Now, carefully slip the epoxy-filled end of the scrap outer housing down the tailcone to the middle aluminum tube section; just like a glass blower, blow an appropriate amount of epoxy onto the tube section, allowing it to flow down each side of the tube to form a fillet. Don't over-do it, but don't be stingy, either! Repeat for all other mounting points.

After the epoxy cures, remove the clamps and piano wire. Presto! No fuss, no mess, just a straight, **VERY WELL ANCHORED**, outer pushrod housing, with little or no weight penalty.

Now, let's install the same 1/8 inch O.D. outer housing in a wooden fuselage. I suppose you could simply repeat the same technique used on the epoxy glass fuselage, but, because the tailcone is easy to access **EARLY** in construction (Here's where planning pays off!), the same, effective task can be performed using low-tech methods. Read on...

Most wooden fuselages use multiple bulkheads in the fwd section to add strength and to shape the structure making outer housing installation, in the fwd section, a cinch. If you followed the rules previously mentioned, you already know where the servos will be mounted and where the pushrods will penetrate the bulkheads.

- Drill/file notches in the edges of the applicable bulkheads for the outer housing (and antenna tube, if used) **BEFORE** beginning fuselage assembly.
- If the outer housing is fairly rigid, and the bulkheads spaced no more

than 6-8 inches apart, you **MAY** not have to epoxy the housings in place, in the fwd section, after the fuselage is constructed. I didn't on my **PARAGON**.

Regarding exit of the outer housing through the side of the tailcone, just under the stabilizer, most kit manufacturers instruct the modeler to drill/file an oblong slot, to insert the housing, then epoxy it in place. Okay... Here's a better way.

- **BEFORE JOINING THE FUSELAGE SIDES TO FORM A TAILPOST**, drill/file the exit slot as usual and insert the outer housing. Put the fuselage to the side for a minute.
- Obtain a length of scrap 1/8 X 3/8 inch spruce spar and some 1/8 inch square spruce stock. CA the square stock along each edge of the spar stock to form an assembly that resembles a bar of staples with a 1/8 inch slot. Cut off a section of this assembly about 2.5 inches long.
- Sand the square stock so the 1/8 inch slot tapers from 1/8 inch to zero along the 2.5 inch length.
- Holding the outer housing in the slot in the fuselage, place the 2.5 inch tapered exit tunnel assembly in place, over the outer housing, on the inside of the fuselage.
- Making sure the tapered square stock contacts the fuselage side, tack the exit tunnel in place. Remove the outer housing; then finish gluing the tunnel with CA. Repeat these steps as required for the other housing; then continue construction of the fuselage until you are ready to close the tailcone with balsa sheeting.
- Prior to closing the tailcone, install the housing in place through the exit tunnel with epoxy. Make sure no epoxy enters the outer housing.
- Run the outer housing through the previously drilled/filed slots in the fwd bulkheads; then set the fuselage to the side for another minute.
- Take the remainder of the spruce assembly you made and cut into

1/2- 3/4 inch lengths. Holding the outer housing as straight as possible, from the exit tunnel to the bulkhead separating the fwd fuselage section from the tailcone, CA the 1/2-3/4 sections over the outer housing about every 6-8 inches.

Finish construction of the fuselage. Fill the gaps on the outside of the fuselage at the exit tunnels with epoxy/micro balloons; cut off the excess outer housing and sand flush. Once the fuselage is covered, you will not be able to detect an outer housing; you will only see the inner rod exiting the fuselage and attached to the control surface.

Try one of these methods on your next sailplane. There is no substitute for the security you'll feel each time you launch after that hard, contest-winning landing.

How Flat Is Flat?

Many factors contribute to a sailplane garnering the title "good flying"; one of those factors, whether built-up or composite, is the modeler's success building a straight airframe. Noted in most assembly instructions as, more-or-less, a key ingredient to straight airframes, is a flat building surface.

I thought obtaining a flat building board was going to be a cinch. Sometimes, words like "old door", "ceiling tile", or "bulletin board material" appear in some assembly instructions and hobby publications. The materials are available locally and inexpensively... Many adjectives can be used to accurately describe these building surfaces, but flat **doesn't** qualify. Posed to my colleagues and peers, the answer to the question, "How flat is flat?" started my long quest for the **FLAT** building board.

I've read many articles on many modeling subjects, but I don't remember any detailed article on constructing a **TRULY** flat building board. I hope this one is amusing and saves you from wasting a lot of your building time and money.

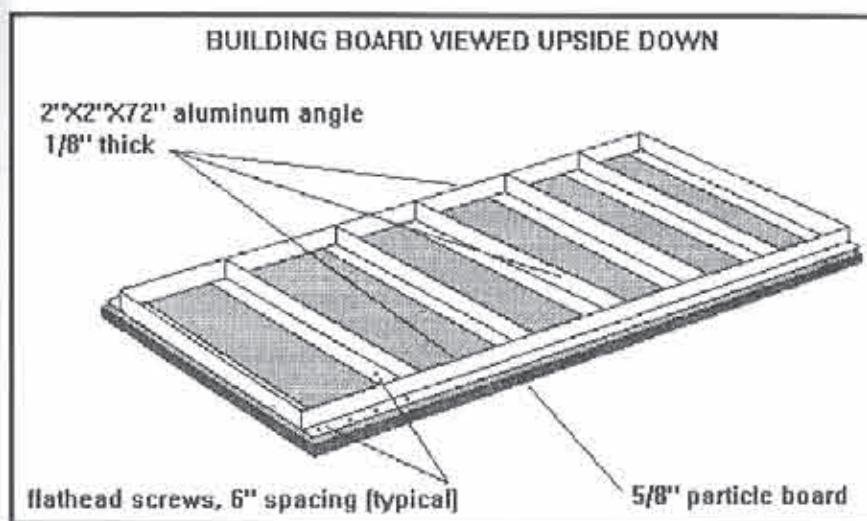
In 1982, when I was into powered aircraft, I built a NORTHEAST AERODYNAMICS BEL-AIRE 40 on a board constructed from a piece of 1

foot by 4 feet by 1 inch thick aluminum honeycomb aircraft floorboard laminated to an equal sized piece of 3/8th inch plywood. Although the aluminum floorboard material started out straight, laminating the plywood to it, with contact cement, induced a very slight, length-wise warp. I counteracted the warp by screwing on two, 4 foot pieces of 1 inch, 7075-T6 aluminum T-angle along the length of the board, one piece flush with each edge. (All of this aluminum was scrap; I worked for an airline. Purchase of these materials in 1997, will put a dent in your sailplane account!) I had to use small pliers to push the pins into the plywood, but the pins held tightly and the surface was tough. The airplane was a great flyer. I wish I still had the board, but that's another story. My experience with this board ultimately lead to constructing a flat board, today.

My board requirements were simple, or so I thought; 2 feet by 6 feet to build two 6 foot wing halves at the same time and, because I'm partial to the built-up floaters, "soft" enough to push pins into (plywood is soft enough for me). Portability and cost were also important, but **FLAT** topped the list.

My trusty 4 foot rule revealed how flawed doors are. Even solid core doors are concave in all directions by as much as 1/8th inch (or convex, depending on the side you have turned up), despite adequately supporting the significant weight of the door. If the door is warped, the ceiling tile or bulletin board material laminated to it is warped, also. Shimming the tile with layers of paper doesn't work, either; if successfully shimmed, the tile won't stay in place unless taped, but won't stay flat if taped. **Scratch the door/tile idea!**

I remembered the board I had constructed in 1982, and decided to build a board similar to it (no expensive aluminum honeycomb floorboard or 7075-T6 angles). I purchased 2 X 2 X 1/8th inch thick aluminum angles from the hardware store to build a frame for a 3/4ths inch birch plywood top. (I thought about using steel angles, but every piece I examined was **severely** bowed; besides, steel is hard to work with.) I framed the plywood with the



angle and ran a cross-member across the center. The frame was inadequate to counter the warping of the plywood. I added additional cross-members, but the plywood top was still not **quite** flat; the plywood actually bowed the aluminum cross-members. Nevertheless, I built a very good-flying PARAGON on it. I was, however, not convinced I could use this board to build more advanced thermal duration or large, scale sailplanes. I gave the board to my son, Matt. The search continued...

Knowing whatever board I constructed would have to be substantially supported to keep the building surface flat, I convinced myself to build not just a board, but a board system - a bench - from stout wood. Using a tightly stretched piece of winch line to check wood straightness (the shortest distance between two points is a straight line), I selected three 2 X 8's, for a 2 feet by 6 feet frame, eight 4 X 4's for bench legs, and a piece of 3/4ths inch birch plywood for the top. 2 X 8 cross-members, were placed every foot along the length of the frame, making the 2 feet by 6 feet frame resemble a large bookcase or extra-wide ladder on its side; the cross-members support the center of the plywood top. I installed 5/8ths inch dia. lag bolts in the bottom of the 8 legs to adjust the table for level (the only reliable way I can determine a twist in the top from one end to the other). I thought I was

pretty smart...

Despite the money and the effort to build this bench, the 2 X 8 frame longers still took on a permanent, 1/32nd inch to 1/16th inch length-wise bow and a 1/8th inch twist due to, I think, the drier conditions in my house. I tried to force these things to move, to no avail! I now have a really nice, **HEAVY**, over-engineered work bench, and less money in my account! The search continued...

I decided it was worth the money to find something pre-built, an ARF building board. Of course, something as large as 2 feet by 6 feet is hard to find. I selected a 30 X 72 inch laminated maple top bench from GRAINGER, very expensive and very warped; I returned it and ordered a 30 X 72 inch table with a top constructed of a particle board core banded with maple and covered, top and bottom, with tempered MASONITE. This variety was not as expensive, was almost flat, **but not quite**.

Now, tempered MASONITE is **really** resistant to pins, so I tried laminating ceiling tiles to the surface. The ceiling tiles followed the imperfections in the top, just like the door. So much for my ARF building board...

At this point, I was becoming increasingly agitated, hard to live with, and I started losing sleep. I even considered giving it all up. I had just spent the last two months trying to find or build a

flat building board. Was I expecting too much? Was good enough "good enough"?

During my two year stint as a MARTIN MARIETTA Precision Mechanic in the mid 80's, I was exposed to the ultimate flat work surface: a precision-ground, 4 feet by 8 feet by 1 foot thick, granite surface table. We worked in the ten-thousandths-of-an-inch tolerance realm measuring components manufactured for satellites and for "Star Wars".

I knew my building board **did not** have to be this good; I also knew granite was impervious to pins. So, somewhere between granite-flat and 1/32nd inch gap had to be "good enough". The search continued...

I made one more trip through the local

home improvement store and eyed, for the hundredth time, the 5/8ths inch particle board. I lifted a sheet and watched it droop, but it stayed relatively flat. It was a relatively stable, composite, manufactured material with a smooth finish. It cost about \$10. Hmmmm...

I have **never** been a fan of particle board. I equate it to cheap (not inexpensive, just cheap!) goods and I think it's hard to work, but in a moment of weakness (open-mindedness?), I realized this stuff might actually work. I bought a piece, had it cut to size, bought more aluminum angles and hardware and loaded the van. I just knew this was going to work...

I spent the better half of a Saturday

laying out the hole pattern for the aluminum angle attaching screws, drilling, deburring and assembling the components into a board. I did things a little differently compared to the board I gave my kid; I placed a cross-member **every foot** along the 6 feet length of the board.

While I assembled the board, I checked flatness, periodically. I was amazed! Once the aluminum was attached, the particle board remained flat. Once complete, my trusty four foot rule confirmed the truth - I had a dead-flat, 2 feet by 6 feet building board! IT WORKED!

Only one other thing to do; laminate something softer to the top for pins. I thought back to the plywood I had laminated to the aluminum floorboard material and hesitated long enough to try a pin in the particle board. Well, what do you know - that works, too, as long as the pin goes straight in! I just could not believe my eyes!

If using the materials I described to build your board, you **ABSOLUTELY MUST** provide adequate support along the board's length! I put the board on that almost-flat particle board core and tempered MASONITE table I kept. I still had to shim the building board in its middle with paper to counteract the 1/32nd inch droop of the table, but the board is dead flat and untwisted. If I were to do this again I might try to obtain 7075-T6 aluminum angles; they're super rigid, structural, aircraft aluminum which probably would maintain full support and flatness of the building board surface, if not supported in the middle.

I suspect I could laminate some ceiling

BILL OF MATERIALS

- (1) 4'X8'X5/8" Particle Board (Cut to 2'X6')
- (4) 2"x2"X72" Aluminum Angle (1/8" thick)
- (1) Box of 100, 11/4", 10/32 Flathead Machine Screws
- (1) Box of 100, 10-32 Locknuts
- (1) No. 12 Drill Bit and Hand Drill

Assorted Handtools

files to my new board that would not induce a warp, but I think I'll save that 'till after I build my next sailplane. This whole, 1997, building season has been a complete bust.

So, how flat is flat? When it comes to aircraft, whether full scale or models, the straighter they are, the better they fly. I hope this article helps you.

See you at the field! ■



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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.

1/4 DG 800 M

...from Sailplanes Unlimited, Ltd.



The DG 800M comes with a Graupner "up and go" pop-up motor unit, which is already installed in the fuselage, with a mega 5-7 motor and Graupner 11 x 6 prop. Just like its full sized sister ship, you can stop the motor, retract the propeller drive, fold it back into the fuselage, and go to the "pure" gliding mode.

With its electric power, this sailplane gives you all of the benefits of electric launching - unassisted flat field thermal duration flying and slope soaring in extremely marginal conditions, when you wouldn't dare fly a normal glider for fear of not making it back onto the hill.

This sailplane is completely and immaculately finished; add nose weight, radio gear, control horns and fly. The wings are styro-balsa, carbon fiber reinforced, covered in Oracover and come with wing bags. The ailerons and flaps are hinged, the spoilers are in and ready to go, and the stab and rudder are finished. The wings come with epoxy glass plug-in winglets and extra extended beautifully shaped wing tips which give you two wing spans (3.7 and 4.2 meters) to choose from. The retractable wheel is installed and ready to go, and there is even a tail wheel! To top it off, this scale sailplane weighs only 10 lbs.! With its HQ 2.5/14 airfoil, the DG 800 will penetrate well; with flaps down it will float in the lightest of lift. Spot landings should be a cinch using a combination of spoilers & flaps. Plane is already built, and a completely finished beautiful scale electric sailplane.

Sailplanes Unlimited, Ltd., 63 East 82nd Street, New York, NY 10028; (212) 879-1634, Fax (212) 535-5295, <www.sailplanes.com>



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ZIKA

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Please note that the cut-off date for classified & display ads is the 1st of the month.

LSF



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

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R/C Soaring Resources

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

Contacts & Soaring Groups - U.S.A.

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

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

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

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

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

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

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

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

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

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

California - Southern Calif. Electric Flyers, John Raley (President), 1375 Logan Ave., Costa Mesa, CA 92626; (714) 641-1776 (D), (714) 962-4961 (F), e-mail: E-Flyer@ix.netcom.com.

California - Torrey Pines Gulls, Ron Scharck, 7319 Olivetas Ave., La Jolla, CA 92037; (619) 451-4900.

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

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

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

Florida (Central) - Orlando Buzzards Soaring Society (www.specs-usa.com/~ingo/Orlandofuzzards), Don Cleveland (Pres.), 1515 Cuthill Way, Casselberry, FL 32707, (407) 696-7516, <Dcleveland3@aol.com>.

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

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

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

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

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

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

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

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

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

Kentucky - Louisville Area Soaring Society, Ed Wilson (Contact), 5308 Sprucewood Dr., Louisville, KY 40291; (502) 239-3150 (eve), e-mail Jay_Burkart@hp.com.

Maine - DownEast Soaring Club (New England area), Steve Savoie (Contact), RR#3 Box 369, Gorham, ME 04038; (207) 929-6639. InterNet e-mail <Jim.Armstrong@juno.com>.

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

Maryland & Northern Virginia - Capital Area Soaring Association (MD, DC, & Northern VA), Chris Bovais (Coordinator), 12504 Circle Drive, Rockville, MD 20850; (703) 642-5513.

Michigan - Greater Detroit Soaring & Hiking Society, Greg Nilsen (Sec.), 2163 Highsplit Dr., Rochester Hills, MI 48307; (810) 651-8598, GNilsen624@aol.com.

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

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

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

Missouri - Mississippi Valley Soaring Assoc. (St. Louis area), Ken Trudeau, 3033 Plum Creek Dr., St. Charles, MO 63303; (314) 926-3537.

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

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

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

Nevada - Las Vegas Soaring Club, Jim Allen (President), 7117 Caprock Cir., Las Vegas, NV 89129; ph (702) 638-2363, fax (702) 658-1998.

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

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

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

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

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

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

New York - Syracuse area, Central NY Sailplane Group, Dave Zintek, Minoa, NY, (315) 556-7103, e-mail Zintek@aol.com.

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

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

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

Ohio - Dayton Area Thermal Soarers (D.A.R.T.S.), Walt Schmoil, 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 tomnagle@freenet.columbus.oh.us

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

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

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

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

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

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

Tennessee - Tullahoma (Southern Middle Area), Coffee Airfoilers, Craig Logan, 147 Stillwood Dr., Manchester, TN 37355, (615) 728-5446, jclogan@edge.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!"

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 - Chip Vignolini, 1305 Perry Ave., Morgantown, WV 26505; (304) 598-9306, <ydne30a@prodigy.com>.

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

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

Outside U.S.A.

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

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

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

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

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

England (southwest) - Sean Walbank, Woolcombe Hayes, 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, fax: IAC+(81) 6-954-4144, e-mail: 76055.3546@compuserve.com, <http://chaos.tufferton.edu/~jclark/skypilot>.

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

Seminars & Workshops

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BBS/Internet

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

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

The Frequent Flier's Info. Hot Line, San Francisco Bay Area - Box 1 (lost & found airplanes, helpful tips, upcoming events), Box 2 (questions), Larry Levstik, (415) 924-4490.

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Reference Material

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

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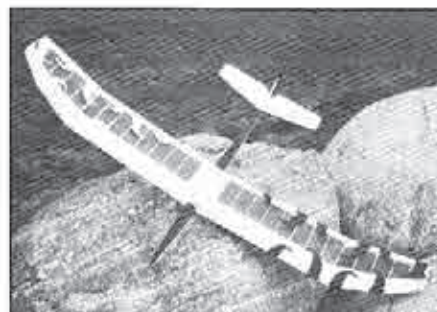
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938 Victoria Avenue
Venice, CA 90291

CA res. add 8.25% tax S&H \$6.00



Short Kit Contents
49" Epoxy Fiberglass Kevlar™
Reinforced Fuselage
Price: \$75.00 + \$10.00 S&H

Servo Cover Set w/Instructions
Covers 1 1/2" x 1 1/2" Servo Well
Trimming Req. \$4.95 per set

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STILETTO RG-15

Canopies & Accessories

An in-house vacuum form machine allows us to produce our own canopies, which are made using PETG 040. If you are looking for a canopy or other vacuum formed accessories (including sailplane, power, etc.), please let us know. We have a large inventory of canopies and do short production runs. Manufacturer inquiries are welcome.

Glider type from 11" - 24"
Standard type from 4" - 16"
Detailed type from 8" - 13"
Others - Various Sizes

Price Range:
Glider Type \$5.00 - \$18.00
Standard Type \$4.00 - \$12.00
Detailed Type \$4.00 - \$12.00



Design Suggestions

Wing Span 100 - 136"
Airfoil RG-15
Controls As Required
3-view available. Plug-in wing.

Fuselage designed to take a heat shrink battery pack in the nose, with a standard size receiver, on/off switch, and 3 standard size servos in tandem. Fuselage designed by Bernard Henwood. Recommended for thermal or slope, intermediate to expert.

Thermal or Slope

Epoxy Fiberglass Fuselages	Price	S&H
Aeolus III (60"/NACA 63A010/3)		
43" fuse, plans	\$65.00	\$10.00
Condor 3m (bolt-on wing mount/up to 10" chord)	\$80.00	\$10.00
52 1/4" fuse, nose cone		
Contestant (148"/E205/3-4/10.5" chord)	\$80.00	\$10.00
60" fuse, canopy, tray		
Elf 2m (bolt-on wing mount/up to 10" chord)	\$70.00	\$10.00
44 3/8" fuse, nose cone		
Factor (83"/E193/3)	\$75.00	\$10.00
41" fuse, hatch, plans		
Oden (100-130"/S3021/As Req./10.25" chord)	\$75.00	\$10.00
51" fuse, canopy		
Raven 3m (119"/Mod. E193/As Req./10.75" chord)	\$80.00	\$10.00
51" fuse, plans		
Smoothie (100"/None/Var.)	\$70.00	\$10.00
49" fuse, hatch		
Special Edition (100-130"/Any/As Req./9.625" chord/bolt-on wing)	\$80.00	\$10.00
54" fuse, nose cone		
Stiletto I (100-136"/Any/As Req./10" max. chord/plug-in wing)	\$75.00	\$10.00
49" fuse		
Stiletto II (100-136"/Any/As Req./10" max. chord/bolt-on wing)	\$75.00	\$10.00
49" fuse		
Stiletto RC-15 (100-136"/RC-15/As Req./plug-in wing)	\$75.00	\$10.00
49" fuse		
Stiletto HQ 25/9 (100-114"/HQ25/9/As Req./10" root cord/plug-in wing)	\$75.00	\$10.00
49" fuse		
Zen (100"/None/Var.)	\$75.00	\$10.00
51" fuse, hatch		

All fuselages are Kevlar™ reinforced.

S&H via U.P.S. - Continental U.S.A.

(Texas residents add 7.25% state sales tax.)

Check or money order only, U.S. funds, please. C.O.D. \$4.75 additional. Prices subject to change without notice.



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These epoxy fiberglass fuselages include suggested specifications (Wing Span/Airfoil/Radio Channels). We do not carry a large inventory, but rather custom make each fuselage as the orders are received. Normal delivery time for most partial/short kits and canopies is 10 days. Large orders take longer. Please call.



Unbeaten Path Imports

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WS: 71 in.
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\$239.00



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WS: 50 in.
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WeMoTec ECOFAN
WS: 40 in.
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WS 100in.
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Cockpit, retract, spoilers.
WS: 218 in.
\$1249.00

Airworld Kirby Kite
Scale but all molded!
WS: 189 in.
\$999.00 RTF!



EMS Nimbus 4D 3.3m
Scale, cockpit, etc.
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\$499.00 RTF!

Simprop L33 Solo
optional electric power
WS: 128 in.
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T.W.I.T.T.

(The Wing Is The Thing)

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

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- P51D- 34 3/4" W.S.
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- K161- 38" W.S.



Complete kits \$35.95 + 7.00 s/h in cont. U.S. (CA res. add 7.75% tax). Send \$1.00 for complete catalog. See our reviews in July '96 Model Builder and QFI 21!

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